

FIRE!



INSTRUCTION MANUAL

FIRE! ROM and Jumper Table

Game	System 11A CPU Rev.	P/N - U15 Game μP	P/N - U27 G. ROM 1	P/N - U26 G. ROM 2	P/N - U21 S. ROM 1	P/N - U22 S. ROM 2	P/N - U24 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 ³	Outhole Kicker	Switched	{ Vio-Brn }	1P11-1	8P3-1 (to B1 on Diode Sw. Bd.)	Q33	AE-23-800-01	
01C ³	L. Rescue & 3-Bank Flashers	Switched	{ Blk-Brn }	(Gry-Brn)		Q33	#89 flashlamps	4p
02A ³	Ball Shooter Lane Feeder	Switched	{ Vio-Red }	1P11-3	8P3-2 (to B2 on Diode Sw. Bd.)	Q25	AE-23-800-03	
02C ³	R. Rescue & 3-Bank Flashers	Switched	{ Blk-Red }	(Gry-Red)		Q25	#89 flashlamps	4p
03A ³	Left Ramp Raise	Switched	{ Vio-Orn }	1P11-4	8P3-3 (to B3 on Diode Sw. Bd.)	Q32	AE-24-900-02	
03C ³	Center Ramp Flashers	Switched	{ Blk-Orn }	(Gry-Orn)		Q32	#89 flashlamps	2p
04A ³	Left Ramp Lower	Switched	{ Vio-Yel }	1P11-5	8P3-4 (to B4 on Diode Sw. Bd.)	Q24	SM-26-600-DC	
04C ³	Window & FIRE Flashers	Switched	{ Blk-Yel }	(Gry-Yel)		Q24	#89 flashlamps	2p
05A ³	Fireplug	Switched	{ Vio-Grn }	1P11-6	8P3-5 (to B5 on Diode Sw. Bd.)	Q31	AE-23-800-06	
05C ³	Right Ramp Lower	Switched	{ Blk-Grn }	(Gry-Grn)		Q31	SM-26-600-DC	
06A ³	Right Lock-up	Switched	{ Vio-Blu }	1P11-7	8P3-6 (to B6 on Diode Sw. Bd.)	Q23	AE-23-800-02	
06C ³	Lwr L. 3-Bank & L. B'box Flash	Switched	{ Blk-Blu }	(Gry-Blu)		Q23	#89 flashlamps	2b,1p
07A ³	Right Ramp Raise	Switched	{ Vio-Blk }	1P11-8	8P3-7 (to B7 on Diode Sw. Bd.)	Q30	AE-24-900-02	
07C ³	Lwr R. 3-Bank & R. B'box Flash	Switched	{ Blk-Vio }	(Gry-Vio)		Q30	#89 flashlamps	2b,1p
08A ³	Knocker (or Ticket Dispenser)	Switched	{ Vio-Gry }	1P11-9	8P3-8 (to B8 on Diode Sw. Bd.)	Q22	AE-23-800-03	
08C ³	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 ⁴	
10	General Illum. (Playfield)	Controlled	Brn-Red	1P12-2	8P3-10	Q9	5580-12145-00 ⁴	
11	General Illum. (Backbox)	Controlled	Brn-Orn	1P12-4	6P3-5	Q16	5580-12145-00 ⁴	
12	Solenoid A/C Select Relay	Controlled	Brn-Yel	1P12-5	8P3-12	Q8	5580-12145-00 ⁴	
13	Flames/Motor Relay (P'fid)	Controlled	Brn-Grn	1P12-6	8P3-13	Q15	5580-12145-00 ⁴	
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 ⁴	
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 { Blu-Vio }	1P19-1	7P1-15 { 7P1-16,8P3-34 } ²	-	FL11630-50VDC	
-	Left Flipper	-	Orn-Gry { Blu-Gry }	1P19-2	7P1-18 { 7P1-19,8P3-32 } ²	-	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!™



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™

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™, 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™, 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.

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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.

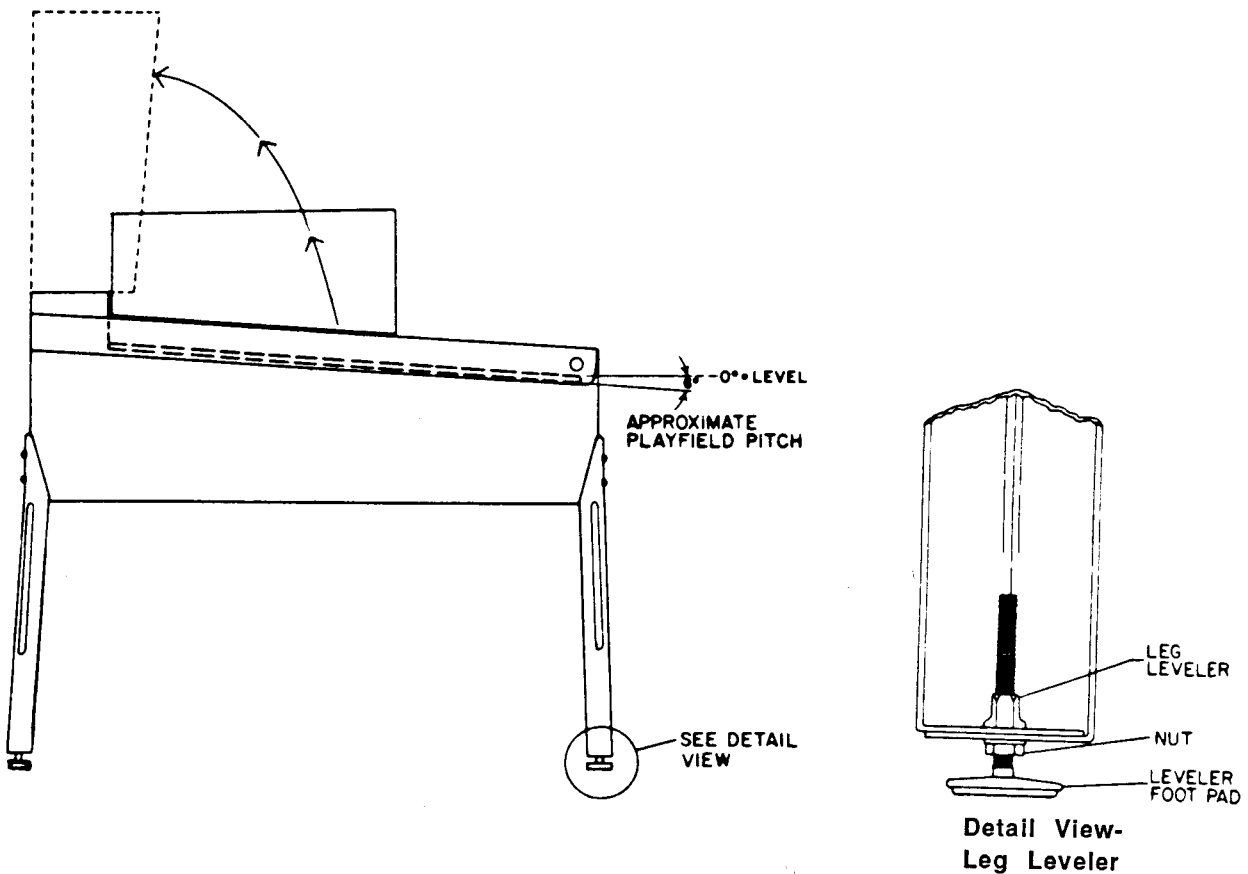


Figure 1. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.

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.

* - 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 1	Player 2	Player 3	Player 4
FIRE	556	Id 00	L-x*

* 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 (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Audit Factor ¹ Value (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:

1. The numbers shown in this column for Items 1 through 4 are examples. 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 (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Factory Setting (Player 4)
Ad 01	or AUTO REPLAY ¹ FIXED REPLAY ¹	10 (%) SCORES ¹
02	REPLAY START (or REPLAY LEVEL 1) ¹	2,000,000
03	REPLAY LEVELS (or REPLAY LEVEL 2) ¹	01 (or OFF)
04	(REPLAY LEVEL 3) ¹	(see text)
05	(REPLAY LEVEL 4) ¹	(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}
12	MAXIMUM CREDITS	2/BIP
13	HIGHEST SCORES	10
14	BACKUP HI. SCR.1	On
15	BACKUP HI. SCR. 2	4,500,000
16	BACKUP HI. SCR. 3	4,000,000
17	BACKUP HI. SCR. 4	3,500,000
18	HI. SCR.1 CREDITS	3,000,000
19	HI. SCR.2 CREDITS	03
20	HI. SCR.3 CREDITS	01
21	HI. SCR.4 CREDITS	01
22	H. S. RESET EVERY (3,000 PLAYS) ²	01
23	FREE PLAY	01
24	U.S.A. 1 COINAGE (1 COIN 1 PLAY) ^{2,3}	NO
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 (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Factory Setting (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 ⁵	INSTALL GERMAN 1 6	
54 ⁵	INSTALL GERMAN 2 6	
55 ⁵	INSTALL GERMAN 3 6	
56 ⁵	INSTALL GERMAN 4 6	
57 ⁵	INSTALL GERMAN 5 6	
58 ⁵	INSTALL GERMAN 6 6	
59 ⁵	INSTALL ADDABALL	NO
60 ⁵	INSTALL 5-BALL	NO
61 ⁵	INSTALL NOVELTY	NO
62 ⁵	INSTALL EX. EASY	NO
63 ⁵	INSTALL EASY	NO
64 ⁵	INSTALL MEDIUM	NO
65 ⁵	INSTALL HARD	NO
66 ⁵	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 . 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 . _
 - 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:

<u>Ad</u>	<u>Name</u>	<u>Setting</u>	<u>Ad</u>	<u>Name</u>	<u>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

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	Ad	Medium Ad	Hard	Ad	Extra	Ad
		Easy	62		63	(Factory)	64	65
31	2 Targets - 1 Hit	Yes	Yes	No	No	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.)

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

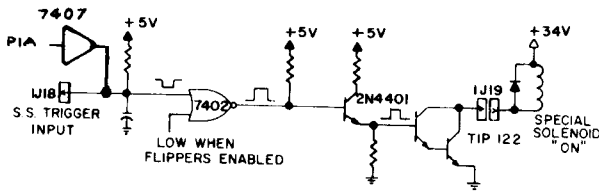
FIRE! Solenoid Table

Sol. No.	Function	Solenoid Type	Wire ¹ Color	Connections		Driver Trans.	Solenoid Part Number Flashlamp Type	
				CPU Bd.	Playfield/Cabinet		b = Backbox	p = Playfield
01A ³	Outhole Kicker	Switched	{ Vio-Brn }	1P11-1	8P3-1 (to B1 on Diode Sw. Bd.)	Q33	AE-23-800-01	
01C ³	L. Rescue & 3-Bank Flashers	Switched	{ Blk-Brn }	(Gry-Brn)		Q33	#89 flashlamps	4p
02A ³	Ball Shooter Lane Feeder	Switched	{ Vio-Red }	1P11-3	8P3-2 (to B2 on Diode Sw. Bd.)	Q25	AE-23-800-03	
02C ³	R. Rescue & 3-Bank Flashers	Switched	{ Blk-Red }	(Gry-Red)		Q25	#89 flashlamps	4p
03A ³	Left Ramp Raise	Switched	{ Vio-Orn }	1P11-4	8P3-3 (to B3 on Diode Sw. Bd.)	Q32	AE-24-900-02	
03C ³	Center Ramp Flashers	Switched	{ Blk-Orn }	(Gry-Orn)		Q32	#89 flashlamps	2p
04A ³	Left Ramp Lower	Switched	{ Vio-Yel }	1P11-5	8P3-4 (to B4 on Diode Sw. Bd.)	Q24	SM-26-600-DC	
04C ³	Window & FIRE Flashers	Switched	{ Blk-Yel }	(Gry-Yel)		Q24	#89 flashlamps	2p
05A ³	Fireplug	Switched	{ Vio-Grn }	1P11-6	8P3-5 (to B5 on Diode Sw. Bd.)	Q31	AE-23-800-06	
05C ³	Right Ramp Lower	Switched	{ Blk-Grn }	(Gry-Grn)		Q31	SM-26-600-DC	
06A ³	Right Lock-up	Switched	{ Vio-Blu }	1P11-7	8P3-6 (to B6 on Diode Sw. Bd.)	Q23	AE-23-800-02	
06C ³	Lwr L. 3-Bank & L. B'box Flash	Switched	{ Blk-Blu }	(Gry-Blu)		Q23	#89 flashlamps	2b,1p
07A ³	Right Ramp Raise	Switched	{ Vio-Blk }	1P11-8	8P3-7 (to B7 on Diode Sw. Bd.)	Q30	AE-24-900-02	
07C ³	Lwr R. 3-Bank & R. B'box Flash	Switched	{ Blk-Vio }	(Gry-Vio)		Q30	#89 flashlamps	2b,1p
08A ³	Knocker (or Ticket Dispenser)	Switched	{ Vio-Gry }	1P11-9	8P3-8 (to B8 on Diode Sw. Bd.)	Q22	AE-23-800-03	
08C ³	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 ⁴	
10	General Illum. (Playfield)	Controlled	Brn-Red	1P12-2	8P3-10	Q9	5580-12145-00 ⁴	
11	General Illum. (Backbox)	Controlled	Brn-Orn	1P12-4	6P3-5	Q16	5580-12145-00 ⁴	
12	Solenoid A/C Select Relay	Controlled	Brn-Yel	1P12-5	8P3-12	Q8	5580-12145-00 ⁴	
13	Flames/Motor Relay (P'fld)	Controlled	Brn-Grn	1P12-6	8P3-13	Q15	5580-12145-00 ⁴	
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 ⁴	
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 [Blu-Vio]	1P19-1	7P1-15 [7P1-16,8P3-34] ²	-	FL11630-50VDC	
-	Left Flipper	-	Orn-Gry [Blu-Gry]	1P19-2	7P1-18 [7P1-19,8P3-32] ²	-	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)

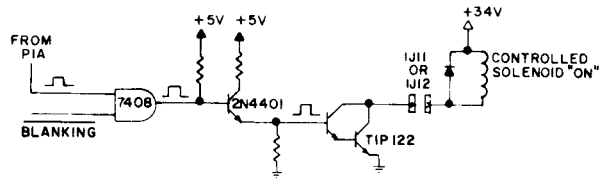
"On" State Logic - Special Solenoid



"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.

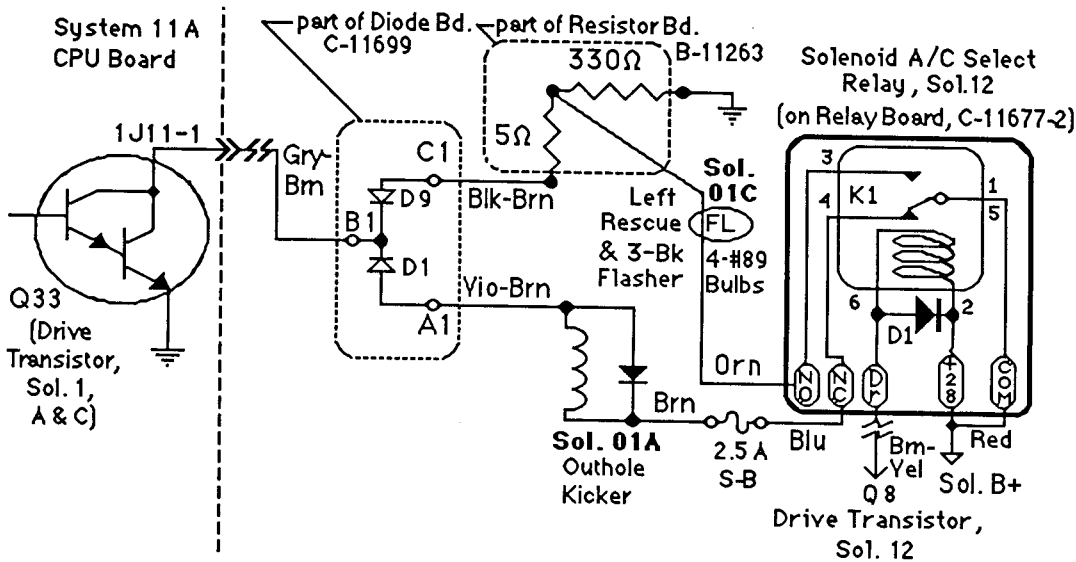


Figure 2. Typical Solenoid A/C Select Relay Circuit

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

Notes: 1. This test assumes that the Coin Door is OPEN; it is initiated ONLY by pressing the CPU Diagnostic Switch (SW2).
 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.

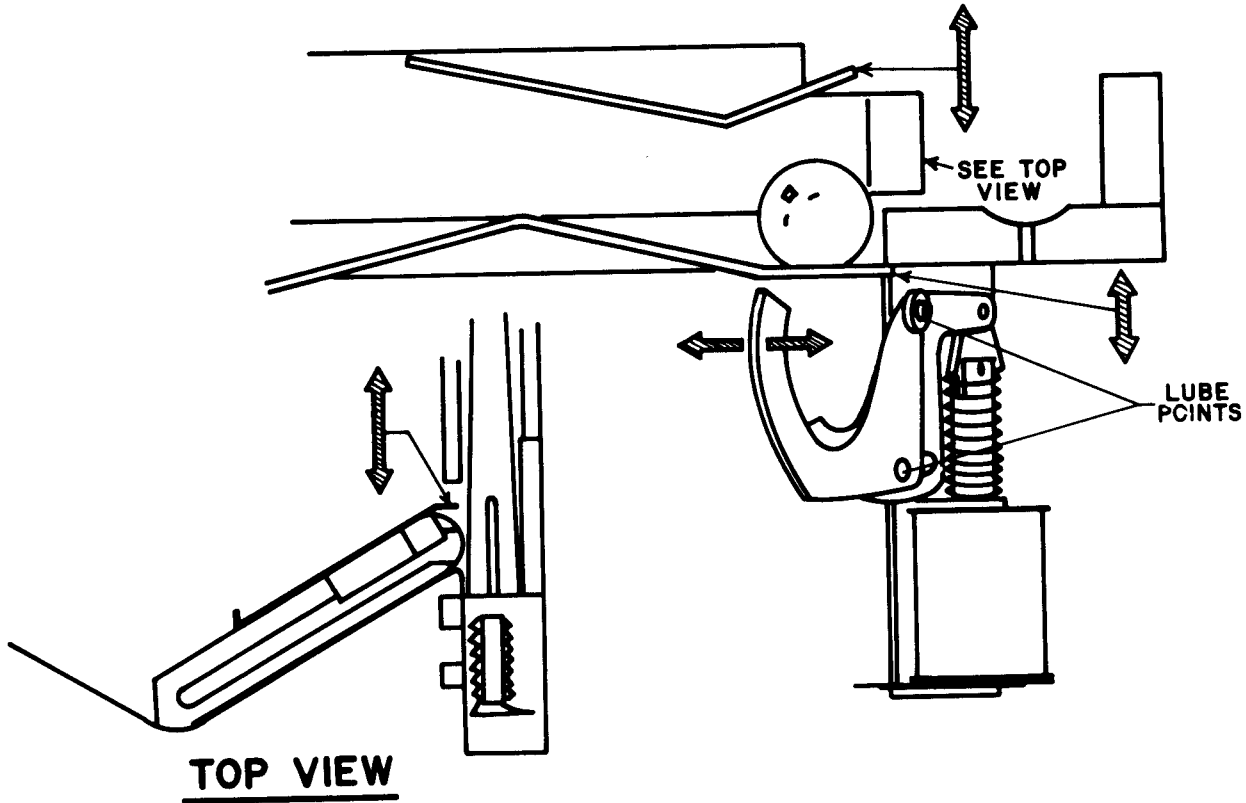


Figure 3. Adjustments and Lubrication Points, Ball Shooter Lane Feeder.

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

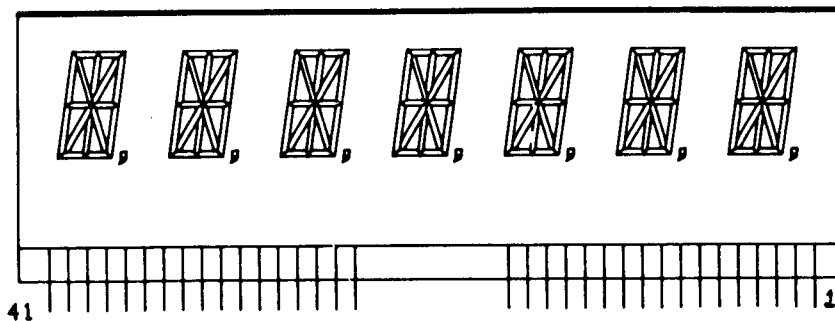
Use ONLY *Rosin-core* solder to repair electrical/electronic problems. Other types of solder can damage or destroy electronic parts, especially Printed Circuit Board wiring and switch contacts.

Section 2

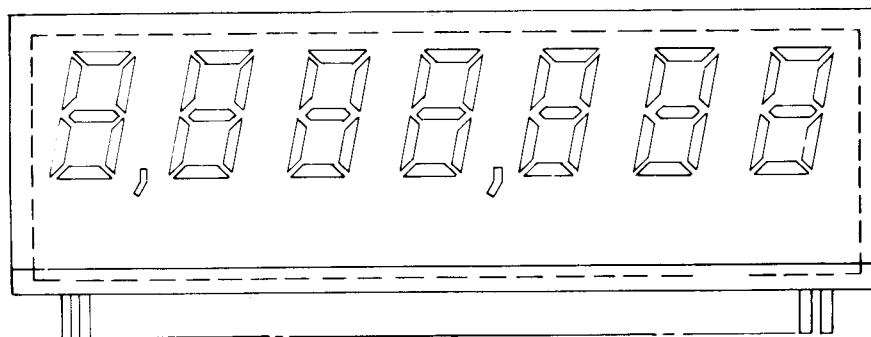
Game Parts Information

- **Parts Lists and Diagrams:**

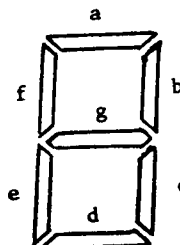
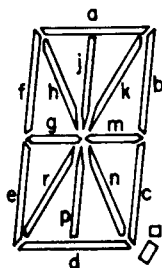
- Displays Information
- Alphanumeric Display Unit Parts
- Power Supply Board (D-8345-554)
- CPU Board (D-11392-556)
- Audio Board (D-11581-556)
- Various PCB Assemblies
- Backbox Parts
- Miscellaneous *FIRE!* Parts
- Flipper Assemblies
- Ball Shooter Lane Feeder
- Fireplug Assembly
- Outhole & Ball 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

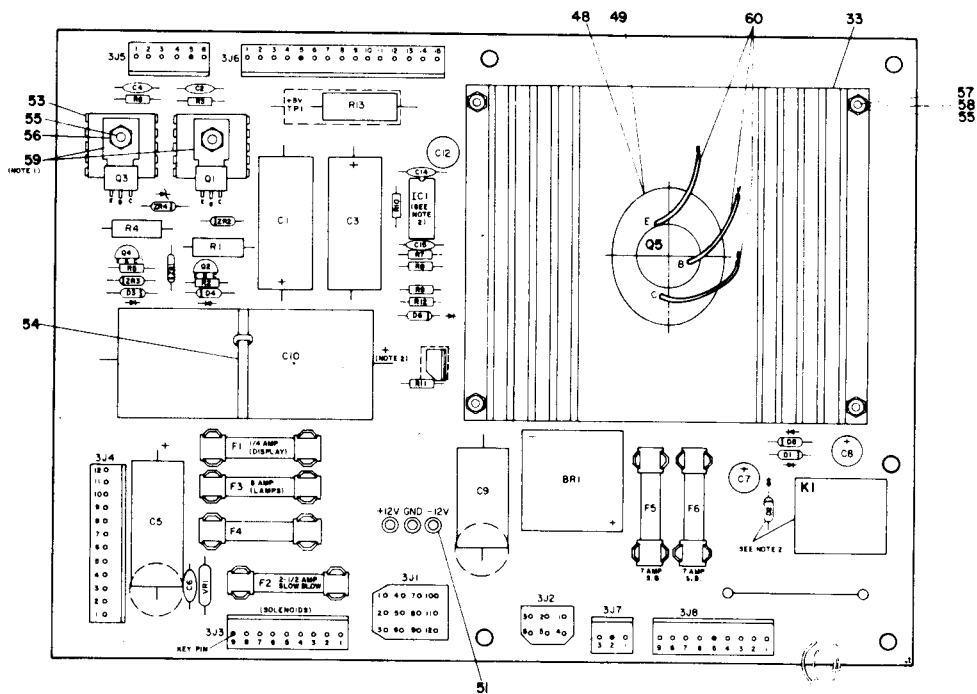


Display Characters Segment Designations

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 μ fd., 20v, \pm 20%, Axial	5670-09439-00	DSPY3, DSPY4	Display, 7-character, 7-segment
5043-08996-00	C3	Capacitor, 0.1 μ 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 μ 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

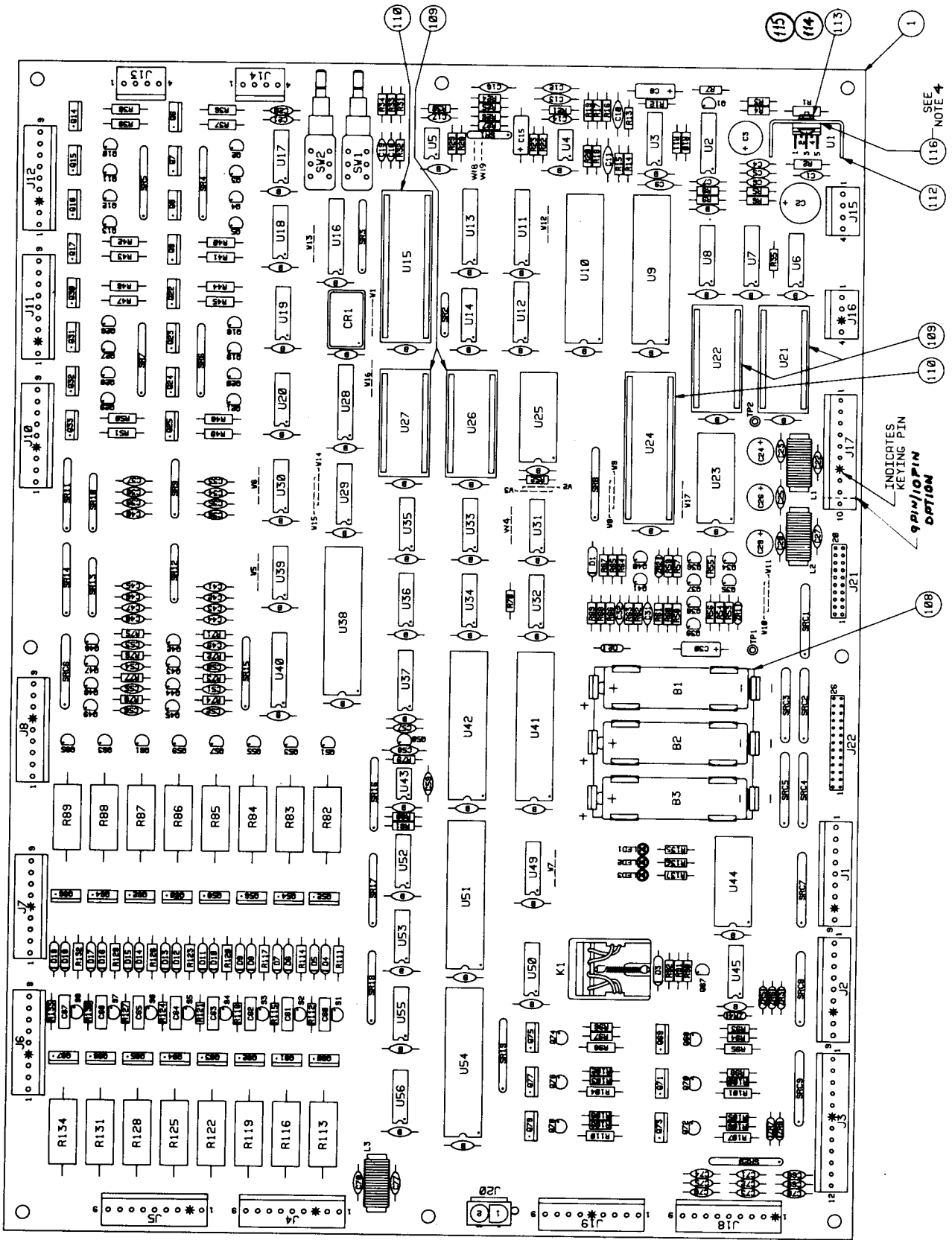
Item	Part No.	Ckt Designator	Description	Item	Part No.	Ckt Designator	Description
1	5765-09466-01		Bare P. C. Board	28	5164-12154-00	Q1	Transistor, MJE15030, NPN
2	5013-09426-00	R7	Resistor, 2.15K, 1%, 1/4w, Metal Film	29	5164-09056-00	Q4	Transistor, MP5D02, NPN
3	5013-09427-00	R8	Resistor, 4.99K, 1%, 1/4w, Metal Film	30	5194-09058-00	Q3	Transistor, MJE15031, NPN
4	5010-09428-00	R11	Resistor, 1.5K, 2%, 1/4w, C. Film	31	5194-09055-00	Q2	Transistor, MP5D52, 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%, 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, 20v, axial	39	5791-09435-00	3J7	Connector, 3 pin (Hdr)
13	5040-09420-00	C9	Capacitor, 1000 mfd, electr, 25v, axial or radial	40	H-11065	3J9	Cable/Connector Assembly
14	5040-09423-00	C12	Capacitor, 330 mfd, electr, 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, 150v	41	5791-09068-00	3J1	Connector, 12 pin (Hdr)
17	5040-09070-00	C5	Capacitor, 100 mfd, electr, 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

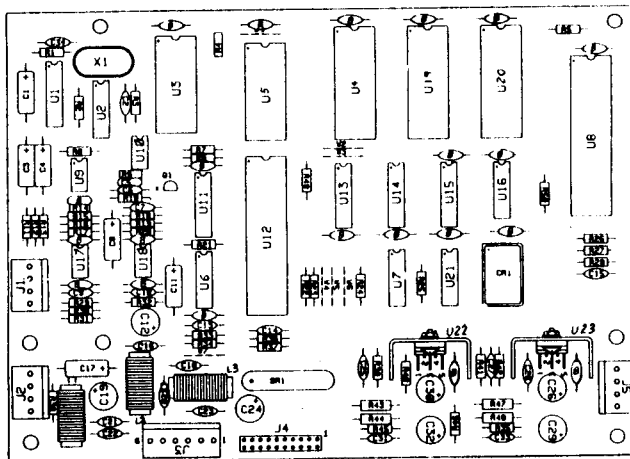
Item	Part No.	Ckt Designator	Description	Item	Part No.	Ckt Designator	Description
1	5764-12091-00		Bare P. C. Board	63	5010-10171-00	R67	Resistor, 56Ω, 5%, 1/4w, C. F.
2	5370-09691-00	U3	IC, CVSD Mod., 55536	64	5010-10170-00	R69	Resistor, 47Ω, 5%, 1/4w, C. F.
3	5370-09321-00	U4, U5	IC, Dual Op Amp, 1458	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, .125w/R, 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, Q60, Q62, Q64, Q66	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, R55, R68, R92	Resistor, 4.7KΩ, 5%, 1/4w, C. F.	a)	A-5343-556-1	U26	IC, Game ROM 2, 27128
49	5010-09358-00	R5, R6, R57, R58, R64, R66, R112, R115, R118, R121, R124, R127, R130, R133	Resistor, 1.0KΩ, 5%, 1/4w, C. F.	b)	A-5343-556-2	U27	IC, Game ROM 1, 27256
50	5010-09113-00	R79	Resistor, 33KΩ, 5%, 1/4w, C. F.	c)	A-5343-556-4	U21	IC, Sound ROM 1, 27256
51	5010-08983-00	R7, R8, R10, R70, R80	Resistor, 3.3KΩ, 5%, 1/4w, C. F.	d)	A-5343-556-3	U22	IC, Sound ROM 2, 27256
52	5010-09034-00	R11-R14, R25, R26, R53, R60, R65, R90	Resistor, 10KΩ, 5%, 1/4w, C. F.	110	5700-08985-00		IC Socket, 40 pin
53	5010-09086-00	R81	Resistor, 6.8KΩ, 5%, 1/4w, C. F.	a)	5400-09150-00	U15	IC, μProcessor, 6802
54	5010-09363-00	R3	Resistor, 5.6KΩ, 5%, 1/4w, C. F.	b)	5400-09150-00	U24	IC, μProcessor, 6802
55	5010-08997-00	R23, R24, R91, R93, R96, R99, R102, R105, R108	Resistor, 2.7KΩ, 5%, 1/4w, C. F.	111	5824-09248-00	TP1, TP2	Test Point
56	5012-09037-00	R113, R116, R119, R122, R125, R128, R131, R134	Resistor, 0.4Ω, 5%, 3w, Wire-Wnd.	112	5705-09199-00		Heatsink, #6030
57	5010-08993-00	R35-R51, R95, R98, R101, R104, R107, R110	Resistor, 68Ω, 5%, 1/2w, C. F.	113	4006-01003-06		Mach. Screw, 6-32 x 3/8", P-PH-S
58	5012-10860-00	R82-R89	Resistor, 27Ω, 5%, 2w, C. F.	114	4406-01117-00		Nut, Hex, 6-32
59	5010-09361-00	R1	Resistor, 220Ω, 5%, 1/2w, C. F.	115	4703-00007-00		Lockwasher, #6
60	5010-09181-00	R2	Resistor, 1.0Ω, 5%, 1/2w, C. F.	116	20-9229		Thermal Compound (see Note 4)
61	5010-09161-00	R4	Resistor, 2.2Ω, 5%, 1/4w, C. F.	117	5580-08994-01	K1	Relay, 4-pole, 40Ω, 6v
62	5010-10003-00	R62, R63	Resistor, 390Ω, 5%, 1/4w, C. F.	118	5791-10862-09	IJ1, IJ2, IJ4-IJ8, IJ10-IJ12, IJ17-IJ19	Connector, 9 pin (Hdr)
				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



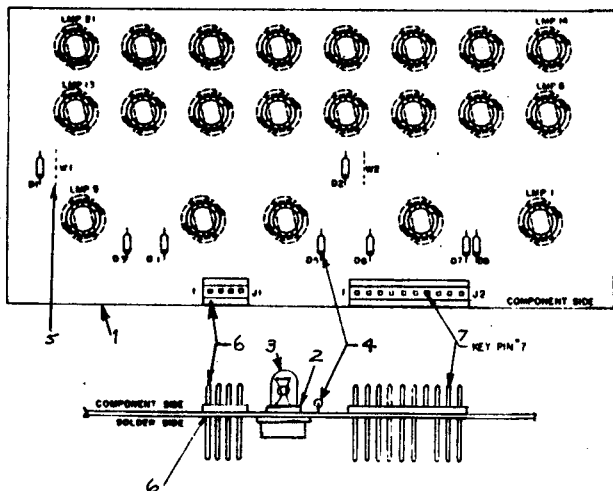
Audio Board Assembly

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, μ 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 μ fd, 63v; +50, -10%
5281-10043-00	U13	IC, 74LS175	5040-09343-00	C1, C3, C4, C8, C17	Capacitor, 10 μ fd, 20v, \pm 20%
5281-09235-00	U21	IC, Triple NAND, 74LS10	5040-10974-00	C12, C19, C24	Capacitor, 100 μ fd, 35v
5370-09321-00	U9, U10, U17, U18	IC, Op Amp, MC1458	5040-09776-00	C26, C30	Capacitor, 470 μ fd, 16v; +50, -10%
5281-09215-00	U2	IC, Hex Inv, 74LS04	5040-12006-00	C29, C32	Capacitor, 1000 μ fd, 16v, 20%
5281-09246-00	U14	IC, 2-4 Dec, 74LS139	5041-09243-00	C25, C28	Capacitor, 10 μ fd, 10v, \pm 10%
5281-09745-00	U15	IC, Dual Mux, 74LS138	5043-08980-00	C5, B (21)*	Capacitor, 0.01 μ fd, 50v, +80, -20%
5370-09156-00	U22, U23	IC, Audio Amp, TDA2002	5043-08996-00	C31, 33	Capacitor, 0.1 μ 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 Ω , 1/2w, 5%	5520-09020-00	X1	Crystal, 3.58 MHz
5010-09161-00	R35, R45	Resistor, 2.2 Ω , 1/4w, 5%	5521-10931-00	CR1	Oscillator, 8 MHz
5010-09361-00	R43, R46, R47	Resistor, 220 Ω , 1/2w, 5%	5551-09822-00	L1 - L3	Inductor, 4.7 μ 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%			

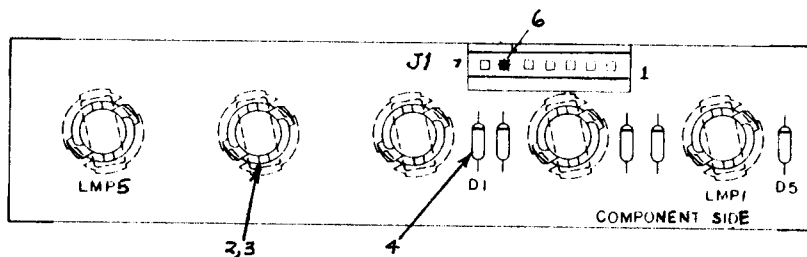
Notes: * 21 capacitors (shown on diagram with "B" symbol) provide +5VDC filtering for ICs.

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

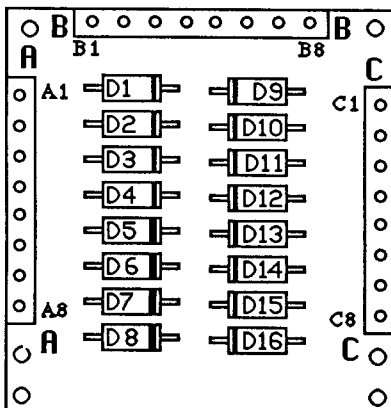
Item	Part No.	Description
1	5768-12153-00	PC Board
2	24-8767	Twist Lamp Socket
3	24-8768	Bulb, #555 (6.3v, .25A)
4	5070-09054-00	Diode, 1N4004
5	5010-09534-00	Resistor, 0Ω
6	5791-10871-07	Header, 7-pin sq post (J1)

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

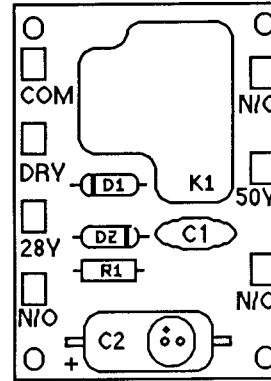
Solenoid A/C Diode Board Assembly p/n C-11702

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

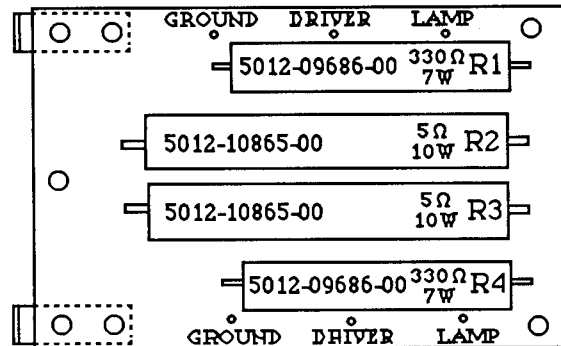
p/n C-11677-3

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

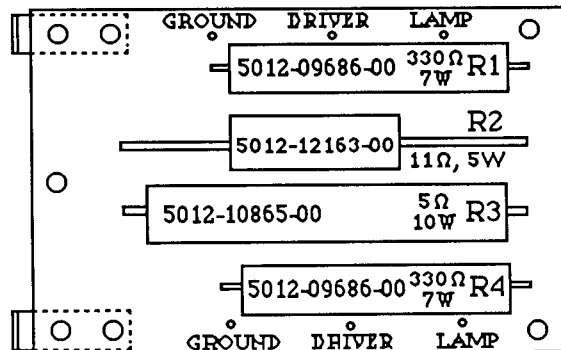


B-11263 Flashlamp Resistor Board

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



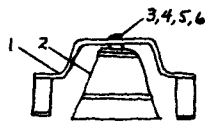
B-11263-1 Flashlamp Resistor Board

(B-11263-2 transposes R2 and R3)

Flasher Lamp Resistor Assembly

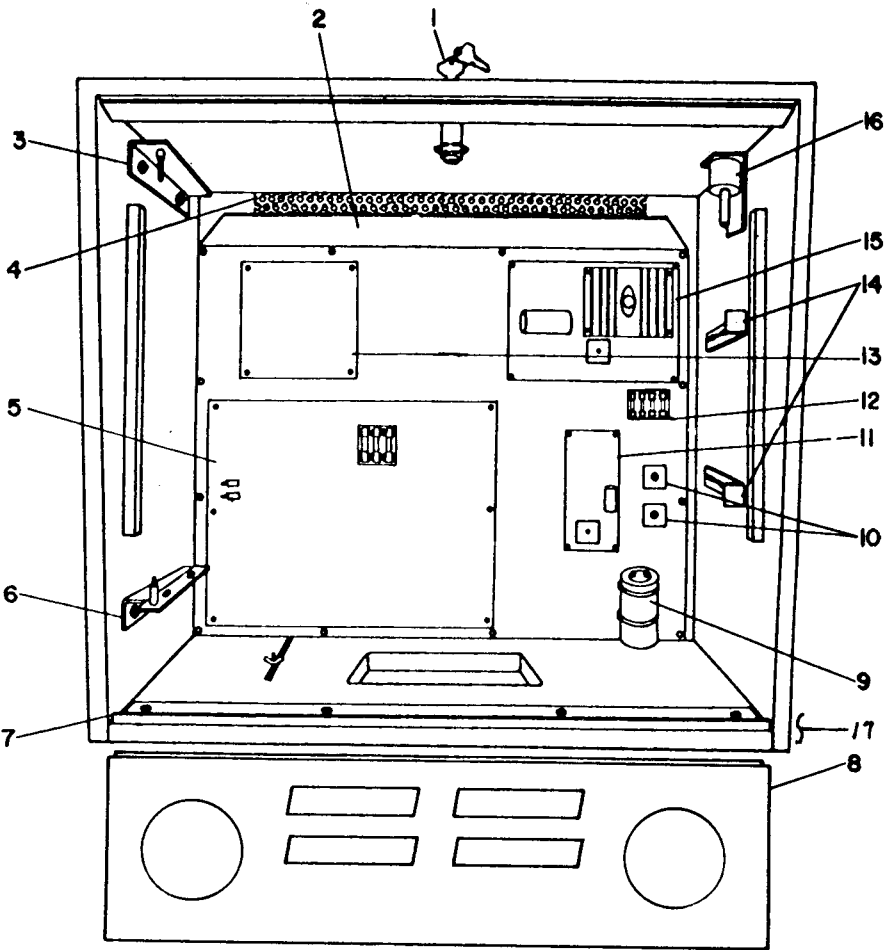
p/n B-11263-2

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



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.
Associated Parts		
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			

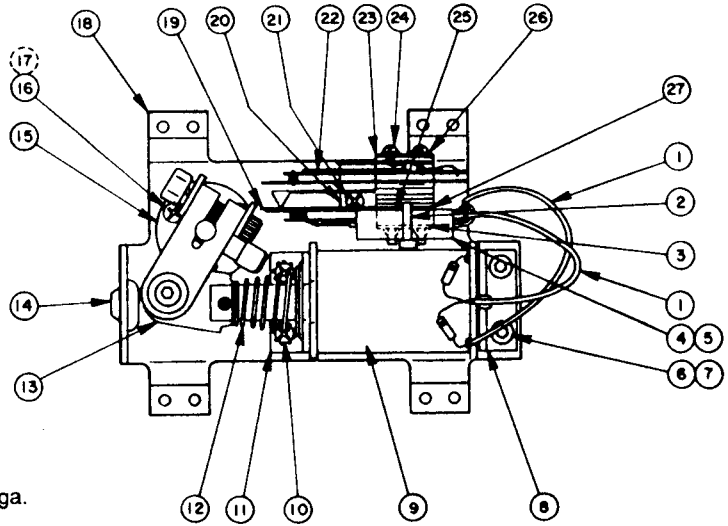
Miscellaneous *FIRE!* Parts

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 Mntg 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 μ 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

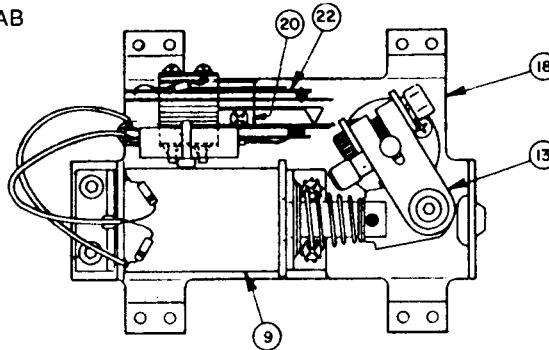
- Each Flipper Assembly is mounted beneath the playfield, in conjunction with the plastic Flipper Paddle and Shaft (20-9250-6) and flipper Rubber (23-6519-4) on the upper side of the playfield.
- The tip of the EOS Switch must travel 0.0150 (+ .010, - .000) inch, before the contacts fully open, with 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 0.015) 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

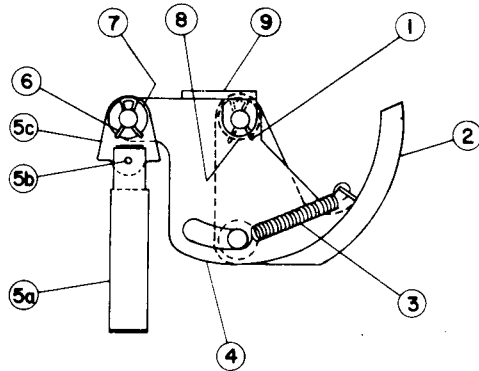
(Parts listed replace same Items of C-11626-R-4)

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)

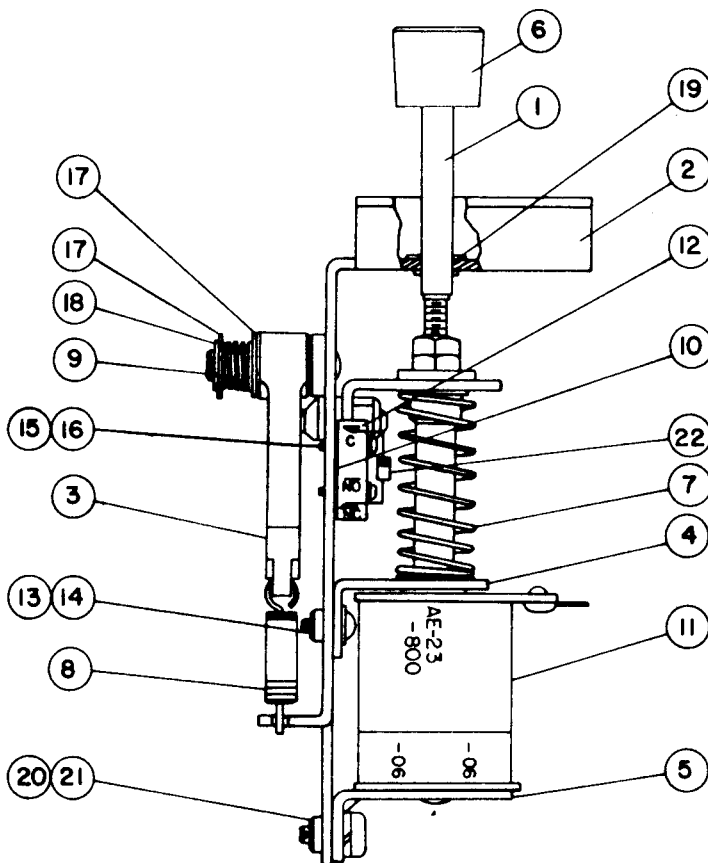
p/n C-9638



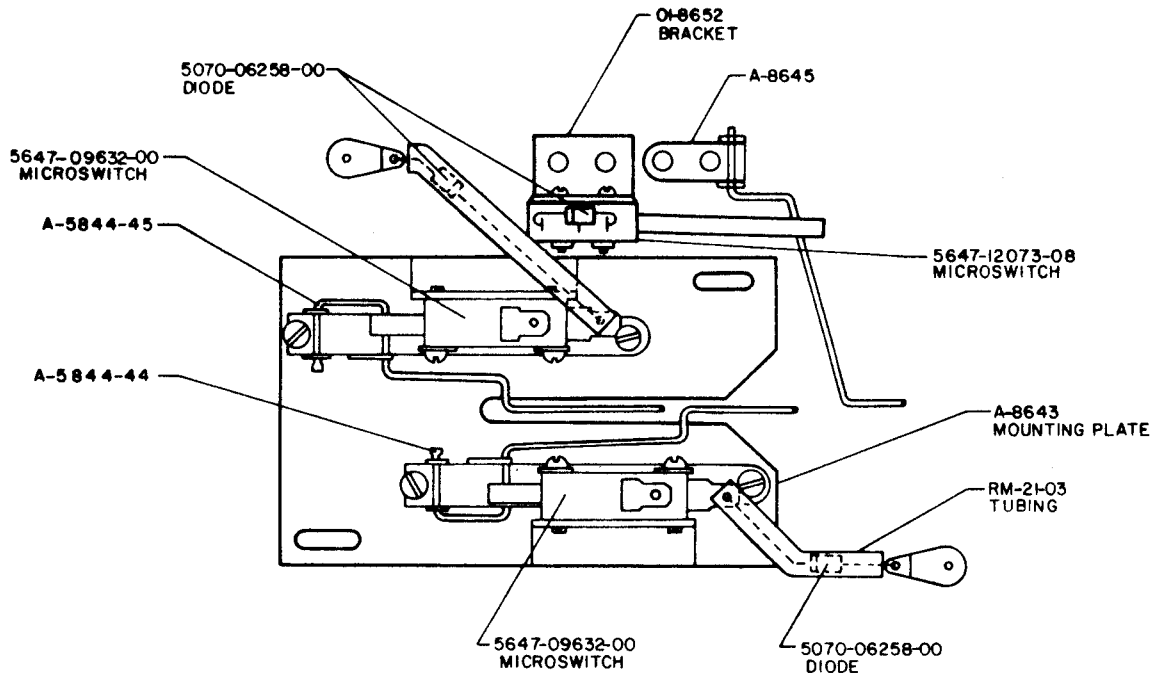
Item	Part No.	Description
1	12-6227	Clip, Hair Pin
2	A-8247	Ball Eject Cam Assembly
3	10-362	Spring
4	A-6949-L	Spring Plate Assembly
5	A-8050-1	Plunger Assembly
a)	02-3407-2	Coil Plunger
b)	20-8716-5	Roll Pin
c)	03-8085	Armature Link
6	12-6227	Clip, Hair Pin
7	4700-00030-00	Washer, 1/2 o.d. x 17/64 i.d.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

Fireplug Assembly

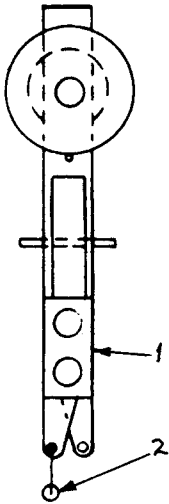
p/n C-11661



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

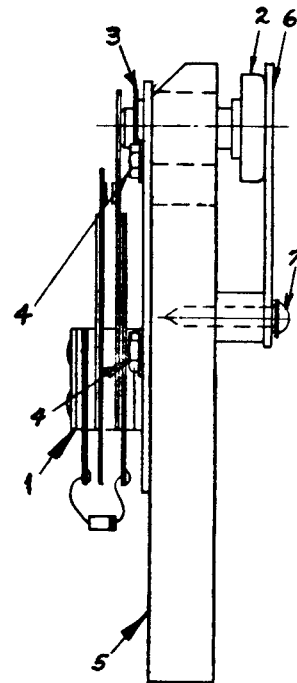


Ball Trough Switch Assembly



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

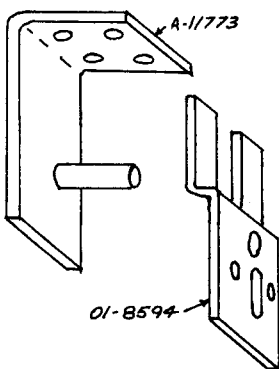


Ramp Target Assembly

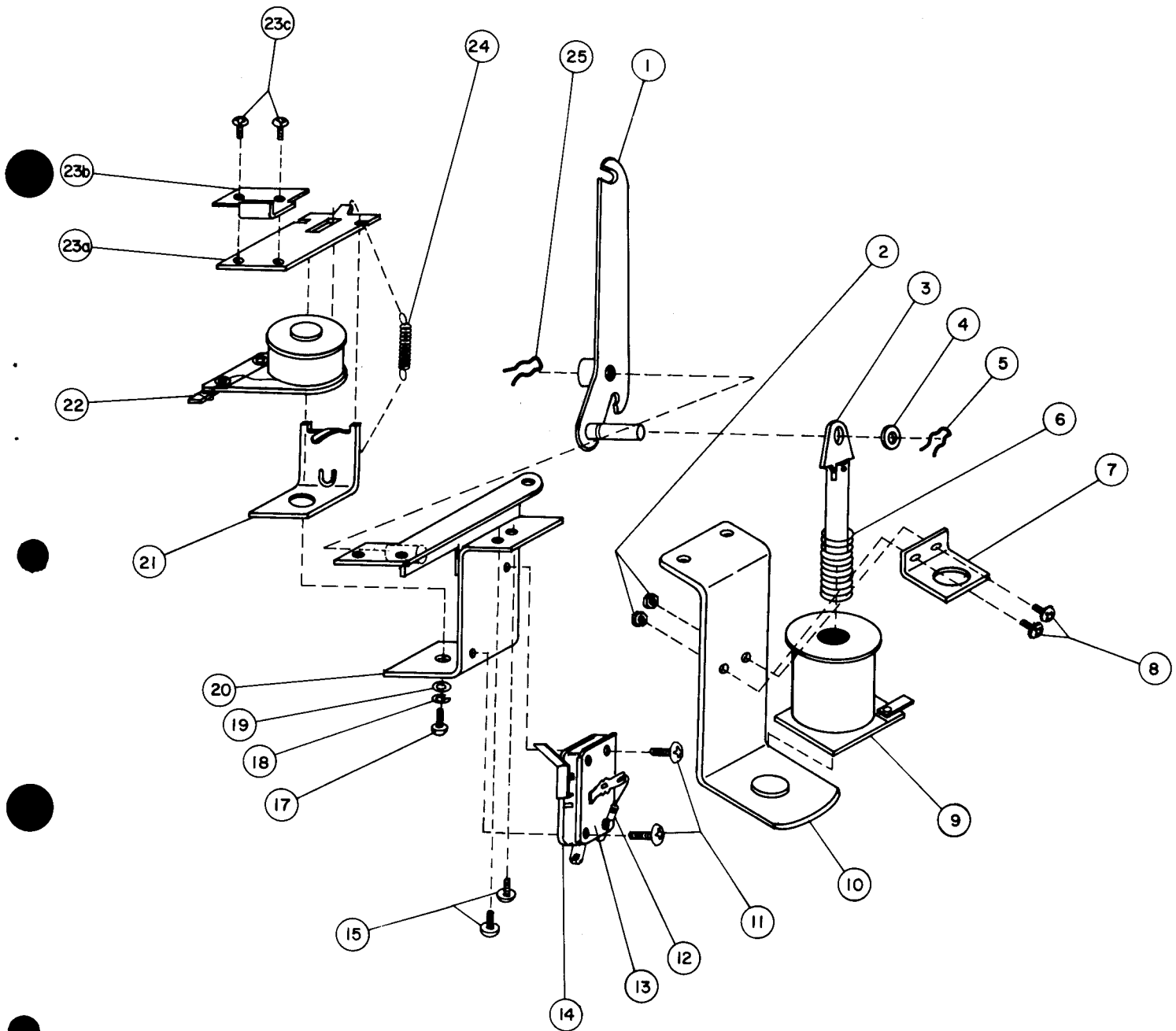
Item	Part No.	Description
1	A-11675	Switch Subassembly
a)	A-11674	Target Bracket Assembly
b)	SW-1A-169	Switch Assembly
c)	01-3670-1	Switch Plate
d)	5070-06258-00	Diode, 1N4001
e)	07-6688-27	Rivet, 1/8" dia. x 9/16"
2	03-7500-5	Credit Button
3	20-8712-31	E-Ring, 5/16"

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

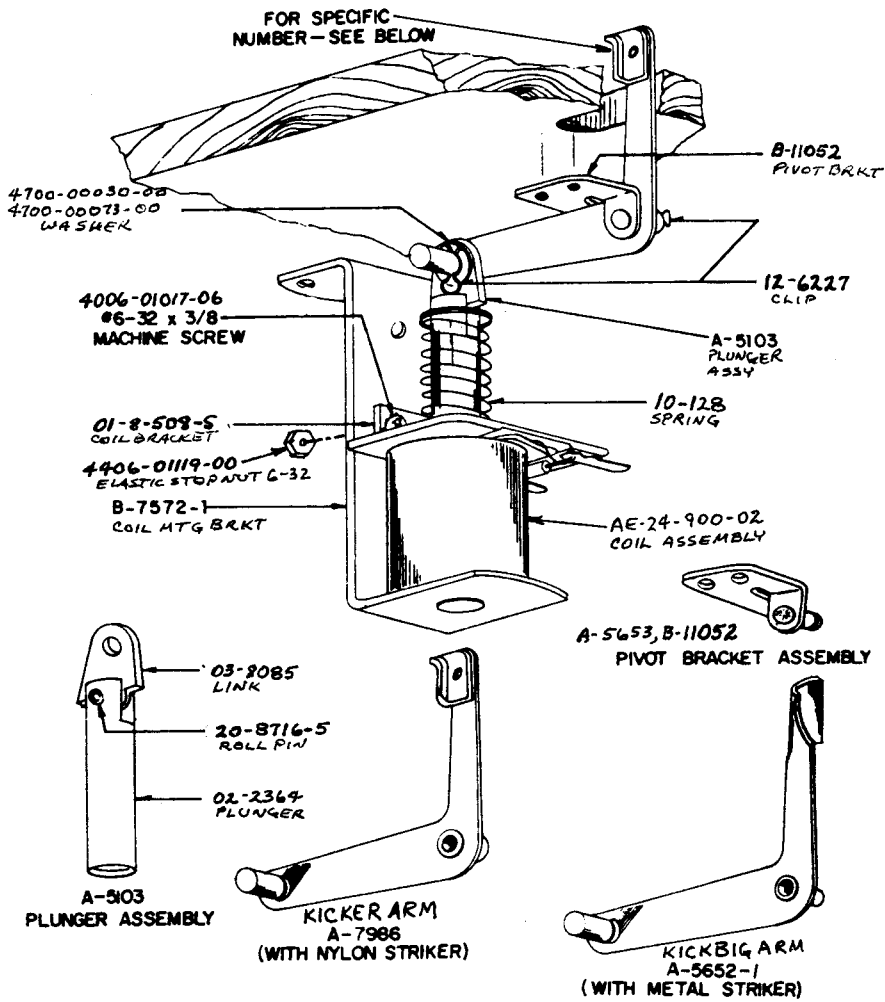


Ramp Lifting Mechanism

(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

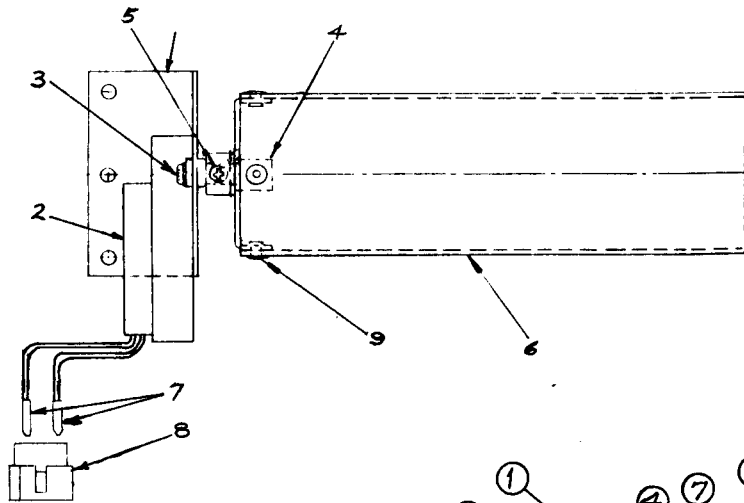


Kickbig Arm Assembly p/n B-11051-R

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 i.d. x 15 ga.
B-11052	Mounting Bracket Assy

Kicker Arm Assembly p/n B-9463

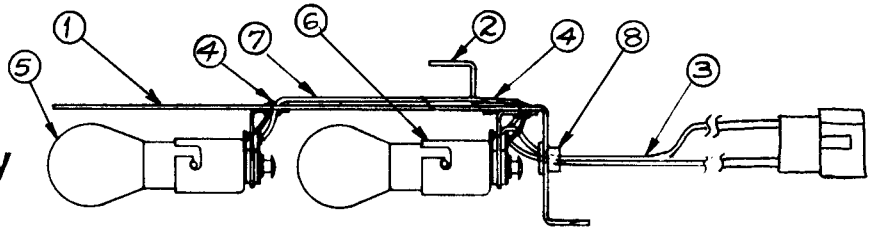
Part No.	Description
12-6227	Clip, Hair Pin
A-7986	Kicker Arm Assembly
A-5103	Plunger Assembly
02-2364	Coil Plunger
20-8716-5	Roll Pin
03-8085	Armature Link
4700-00073-00	Washer, 1/2 o.d. x 9/32 i.d. x 15 ga.
A-5653	Mounting Bracket Assy



Flames Tube Assembly p/n B-11492

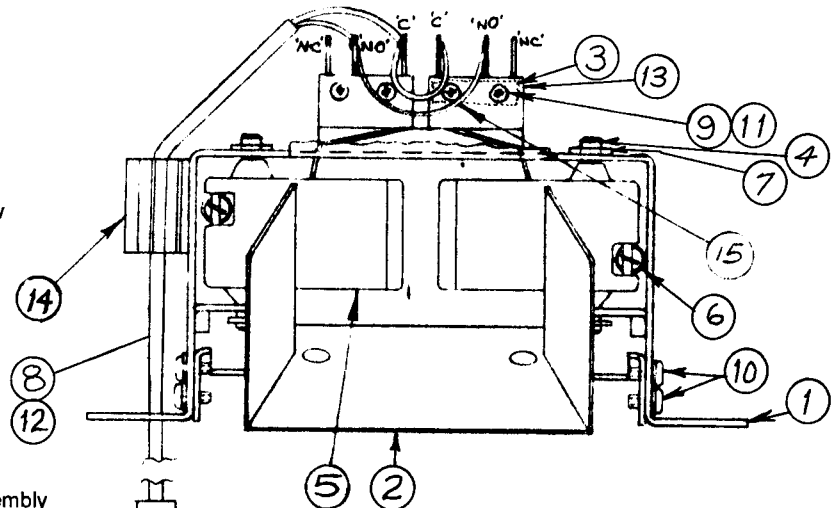
Item	Part No.	Description
1	01-8546	Motor Bracket
2	14-7944	Motor, 10 rpm
3	4006-01017-04	Mach. Screw, 6-32 x 1/4, P-RH
4	A-11491	Drive Bracket Assembly
5	4006-01076-04	Set Screw, 6-32 x 1/4
6	B-11498	Tube & Decal Assembly
7	5820-09080-00	Connector Pin
8	5791-09111-00	Connector Shell
9	07-6701	Rivet,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

Flames Lamps Assembly p/n B-11715

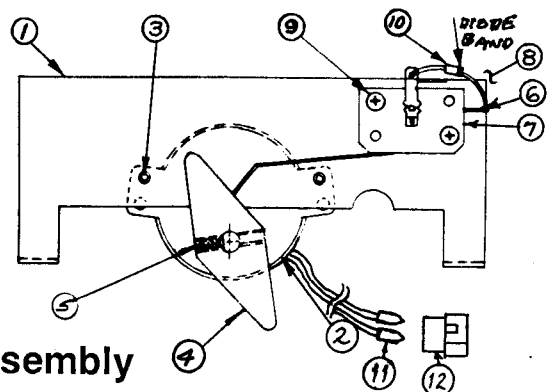


Item	Part No.	Description
1	01-8667	Motor Bracket
2	01-8669	Flames Tube Guide
3	H-11730	Flames Lamps Cable
4	07-6688-16N	Rivet, 1/8 x 1/8
5	24-8771	Lamp, #1683, 28v
6	24-8789	Lamp Socket
7	HW-30022-4	Wire, 22 AWG, Yellow
8	03-7869-1	Bushing

"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

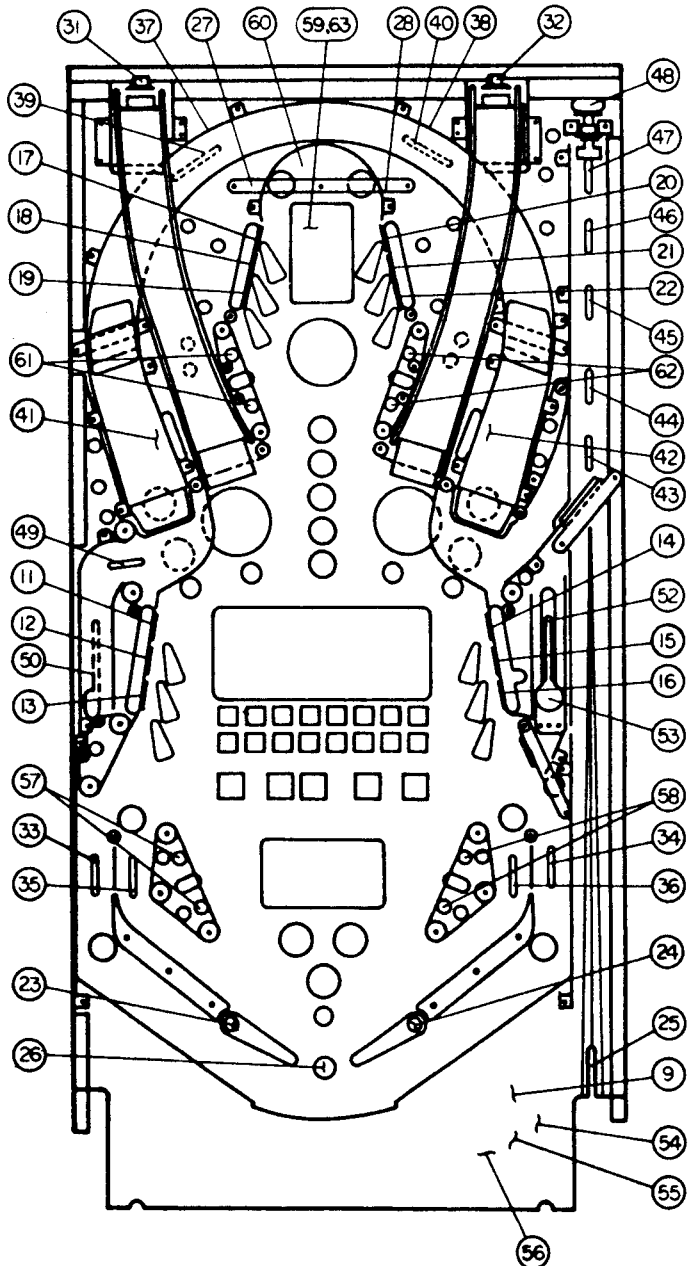


Ladder Ramp Motor Assembly p/n B-11

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

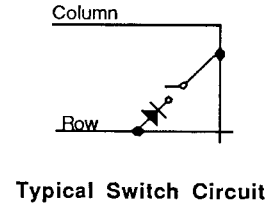
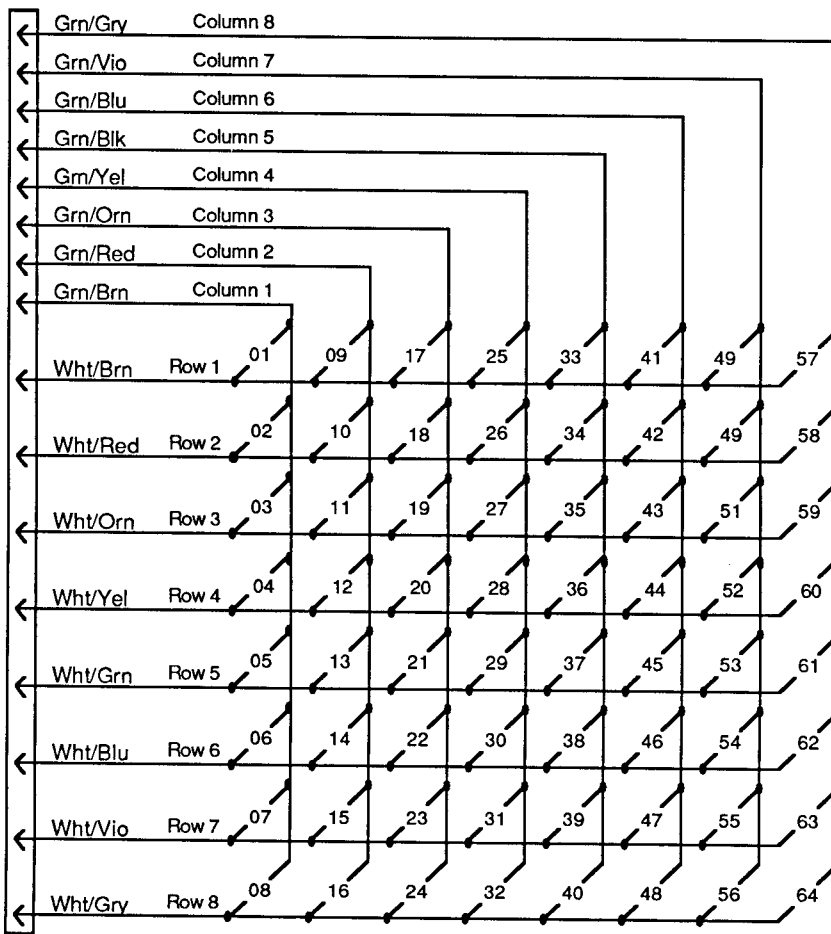
Switches

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)



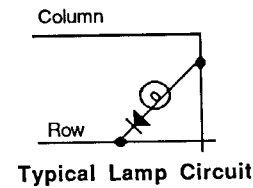
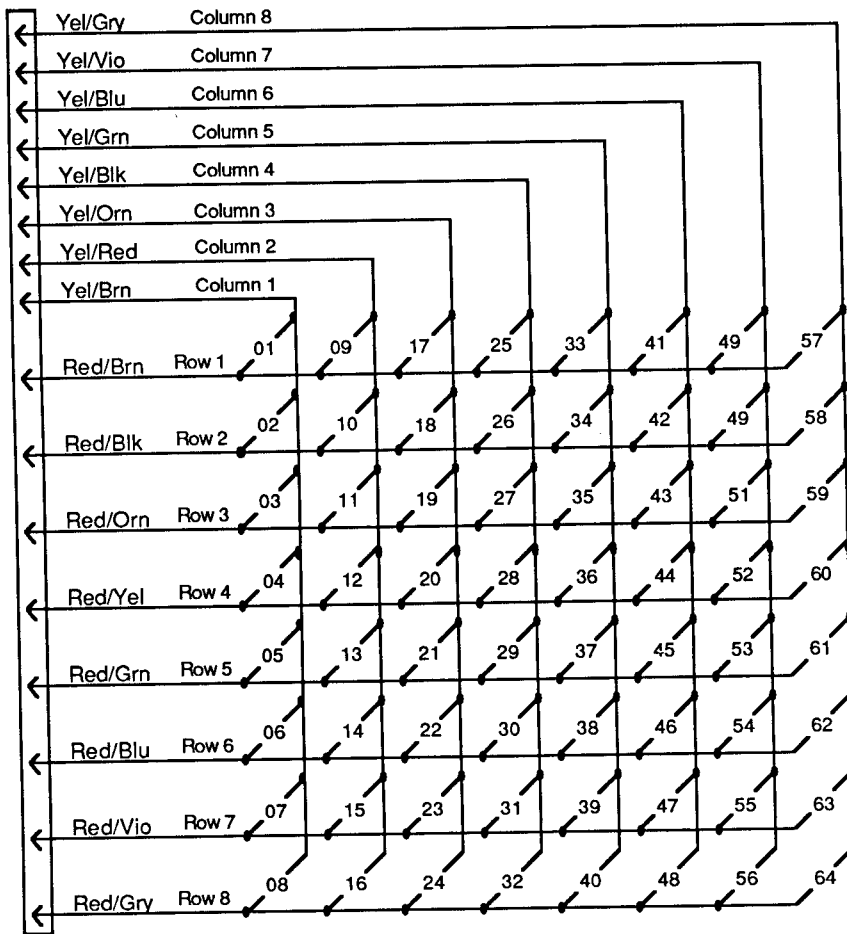
Item	Part No.	Description
54	5647-09957-00	Ball Trough #3 (left)
55	5647-09957-00	Ball Trough #2 (mid)
56	5647-09633-00	Ball Trough #1 (right)
57	SW-1A-122	Left Sling (scoring)***
58	SW-1A-122	Right Sling (scoring)***
59	17-1012	Center Ramp Down
60	5647-12073-05	L & R Windows
61	SW-1A-122	Upper Left 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

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

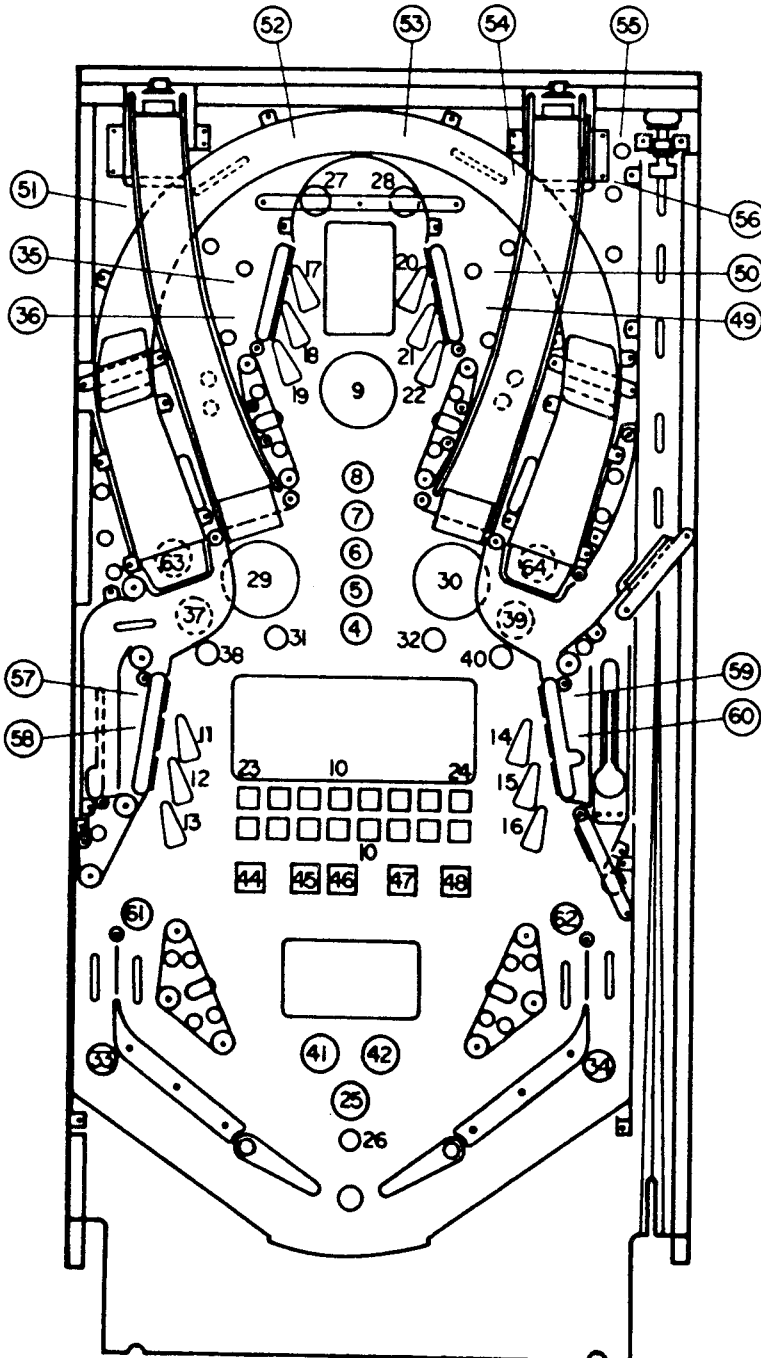


2 Double Lamps

FIRE! Lamp-Matrix Table

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

Lamps



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)

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)

Solenoids/Flashers

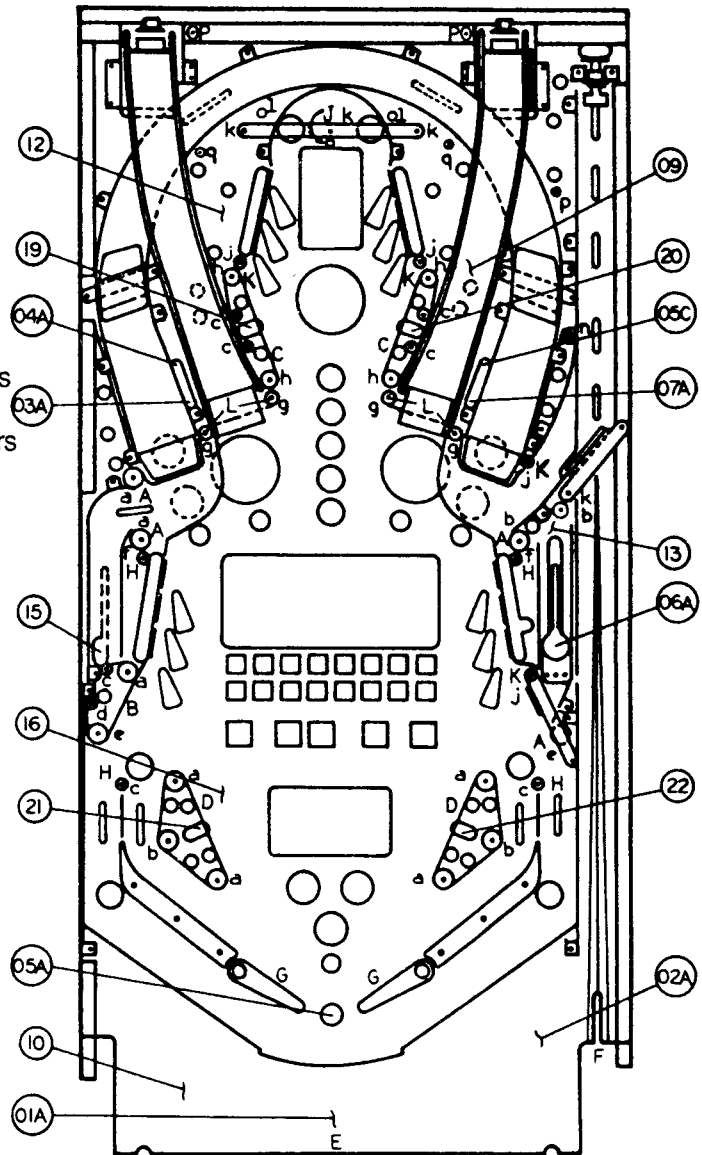
Item	Part No.	Description
01A	AE-23-800-01	Outhole Kicker
01C	#89 Flashlamps	L. RESCUE & 3-Bank Flashers
02A	AE-23-800-03	Ball Shooter Lane Feeder
02C	#89 Flashlamps	R. RESCUE & 3-Bank Flashers
03A	AE-24-900-02	Left Ramp Raise
03C	#89 Flashlamps	Center Ramp Flashers
04A	SM-26-600-DC	Left Ramp Lower
04C	#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'field***
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



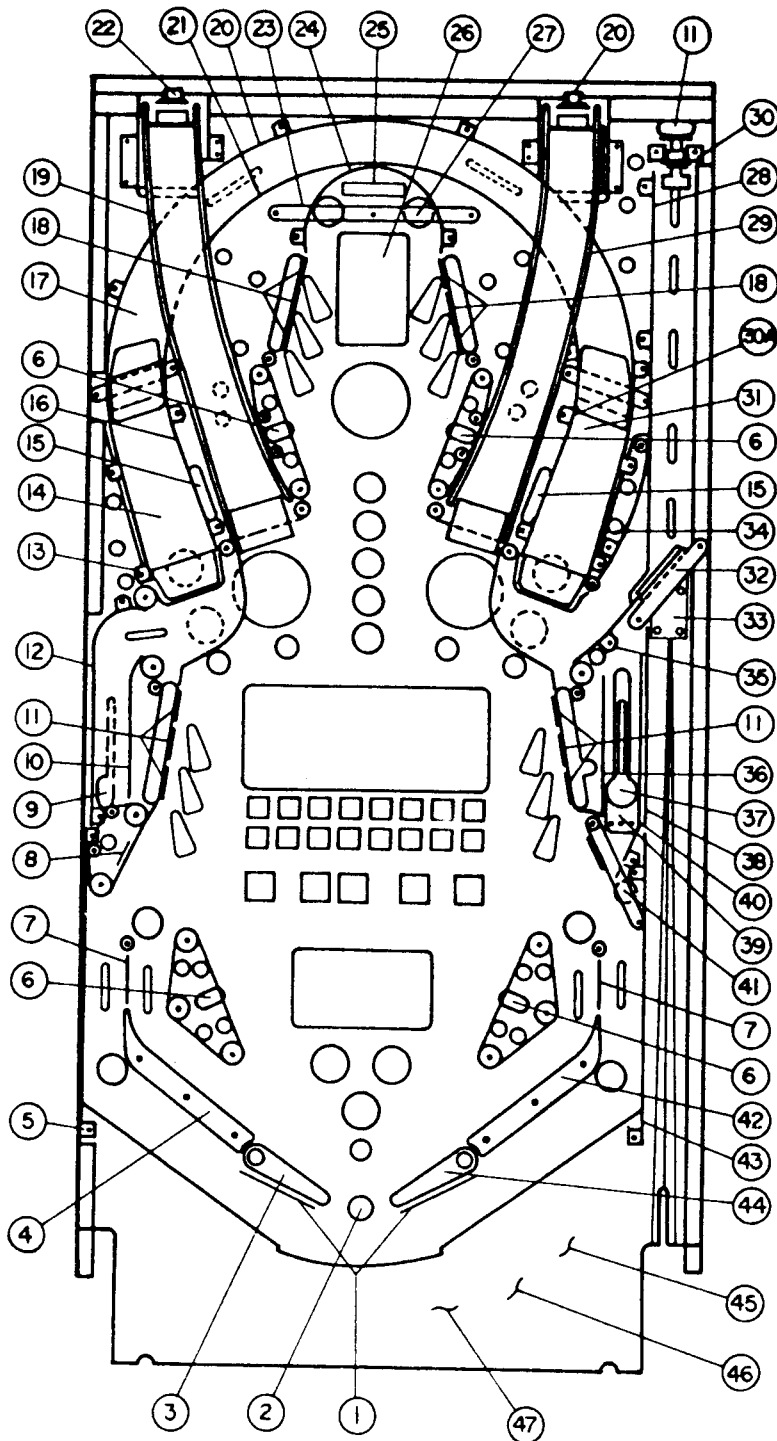
Playfield Posts

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

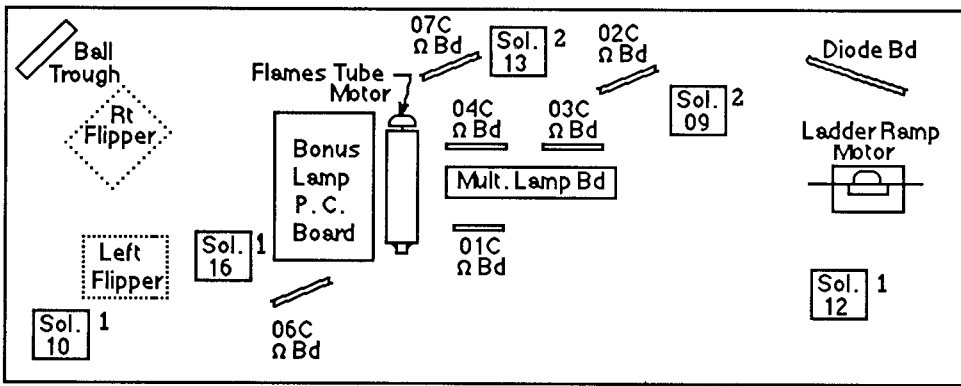
Item	Part No	Description	Qty.
A	23-6300	5/16" Ring	4
B	23-6304	1-1/2" Ring	1
C	23-6305	2" Ring	2
D	23-6306	2-1/2" Ring	2
E	23-6313-1	Grommet	1
F	23-6327	Ball Shooter Tip	1
G	23-6519-4	Red Flipper Ring	2
H	23-6535	Bumper	4
J	23-6552	Sleeving, Yellow	1
K	23-6556	Sleeving, Black	4
L	23-6579	Bumper, 3/4"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

Playfield Parts



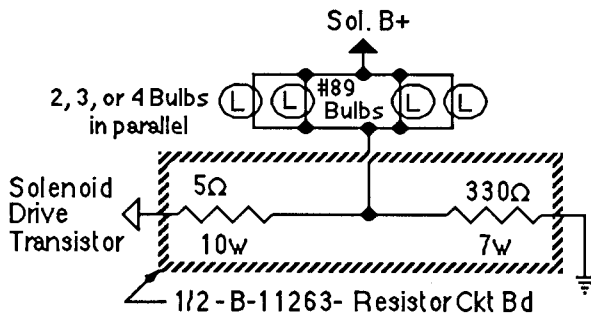
Item	Part No.	Description
1	12-6468	Anti-Rebound Wire
2	C-11661	Fireplug Mechanism
3	C-11626-L-4	Flipper Assembly
a)	20-9250-6	Flipper Arm on Shaft
4	A-8151-L	Left Flipper Return Frame
5	B-7537-1	Ball Guide Assembly
6	B-9463	Kicker (Slingshot) Assembly
7	12-6466-6	Wireform, 1-1/2"
8	12-6466-4	Wireform, 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
45	C-9638	Ball Shooter Lane Feeder
46	B-8644	Ball Trough Switch Assembly
47	B-8039	Outhole Kicker Assembly

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

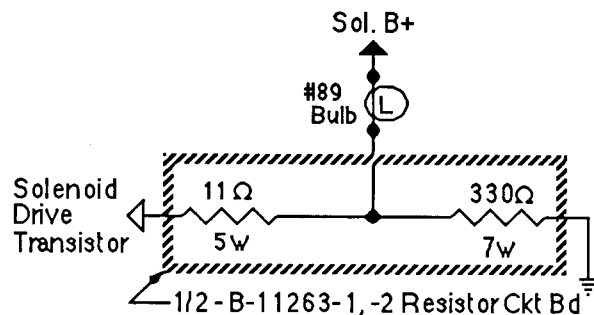


Playfield Circuit Boards Locations
(under side of playfield)

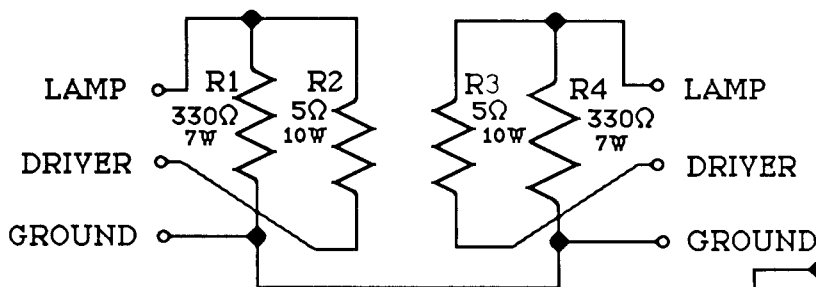
Part No.	Description	Part No.	Description
C-11626-R-4	Right Flipper Assembly	C-11626-L-4	Left Flipper Assembly
C-11677-2	Relay Board (Sol. 10, 12, 16) ¹	C-11677-3	Relay Board (Sol. 09, 13) ²
C-11702	Solenoid A/C Diode Board	C-11740	Mult. Lamp Board
C-11718	Bonus Lamp P. C. Board	14-7944	Ladder Ramp Motor
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



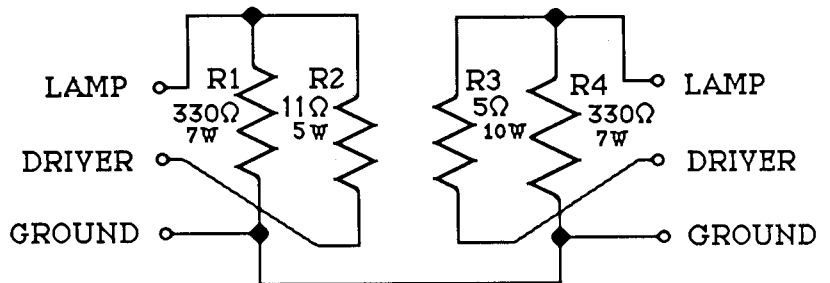
#89 Flashlamps Circuit



#89 Flashlamp Circuit



**B-11263
Resistor Board Schematic**



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

Section 3

Reference Diagrams

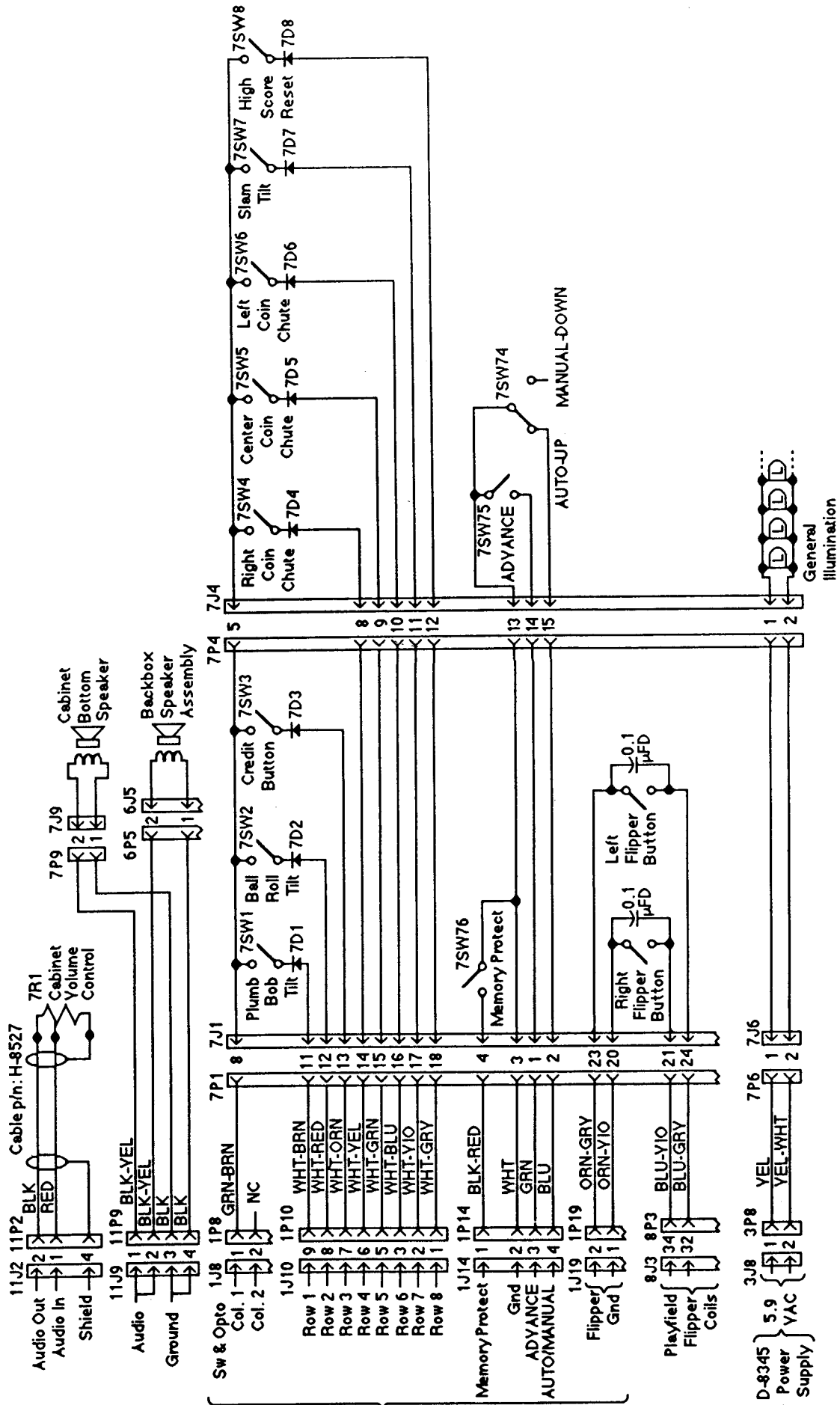
&

Schematics

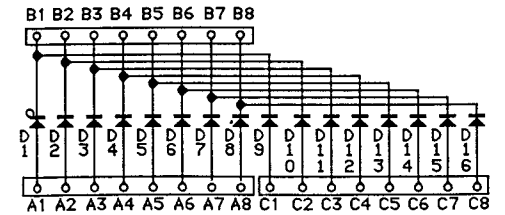
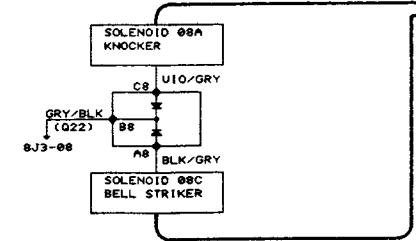
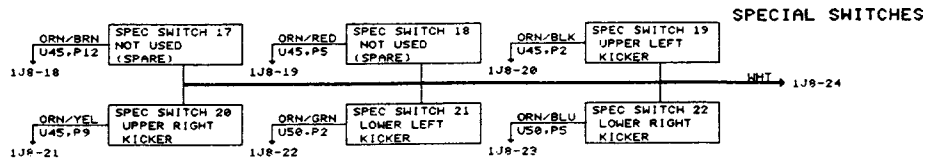
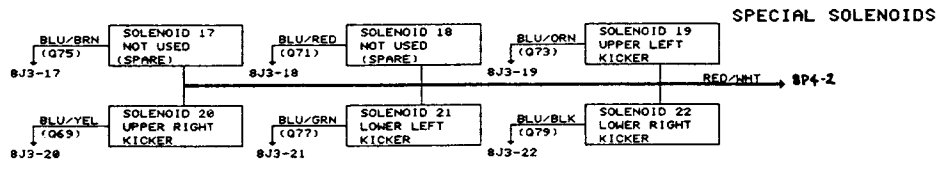
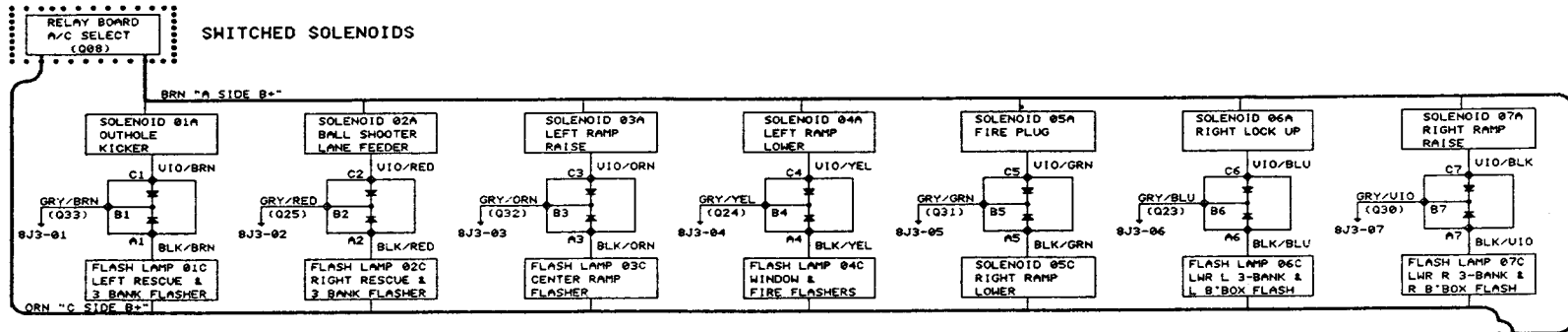
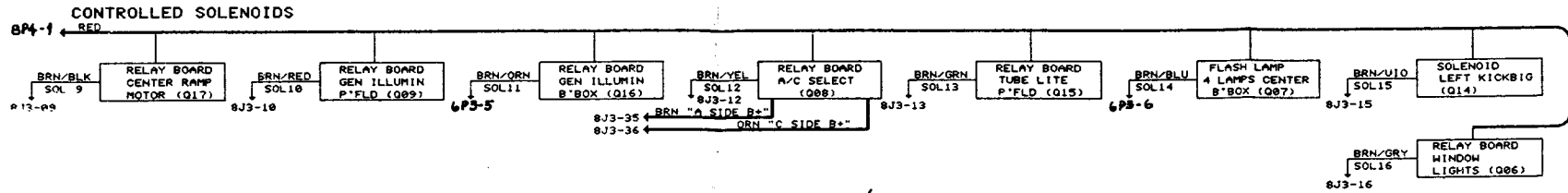
- **Diagrams and Schematics:**

- 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**

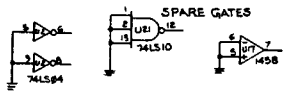
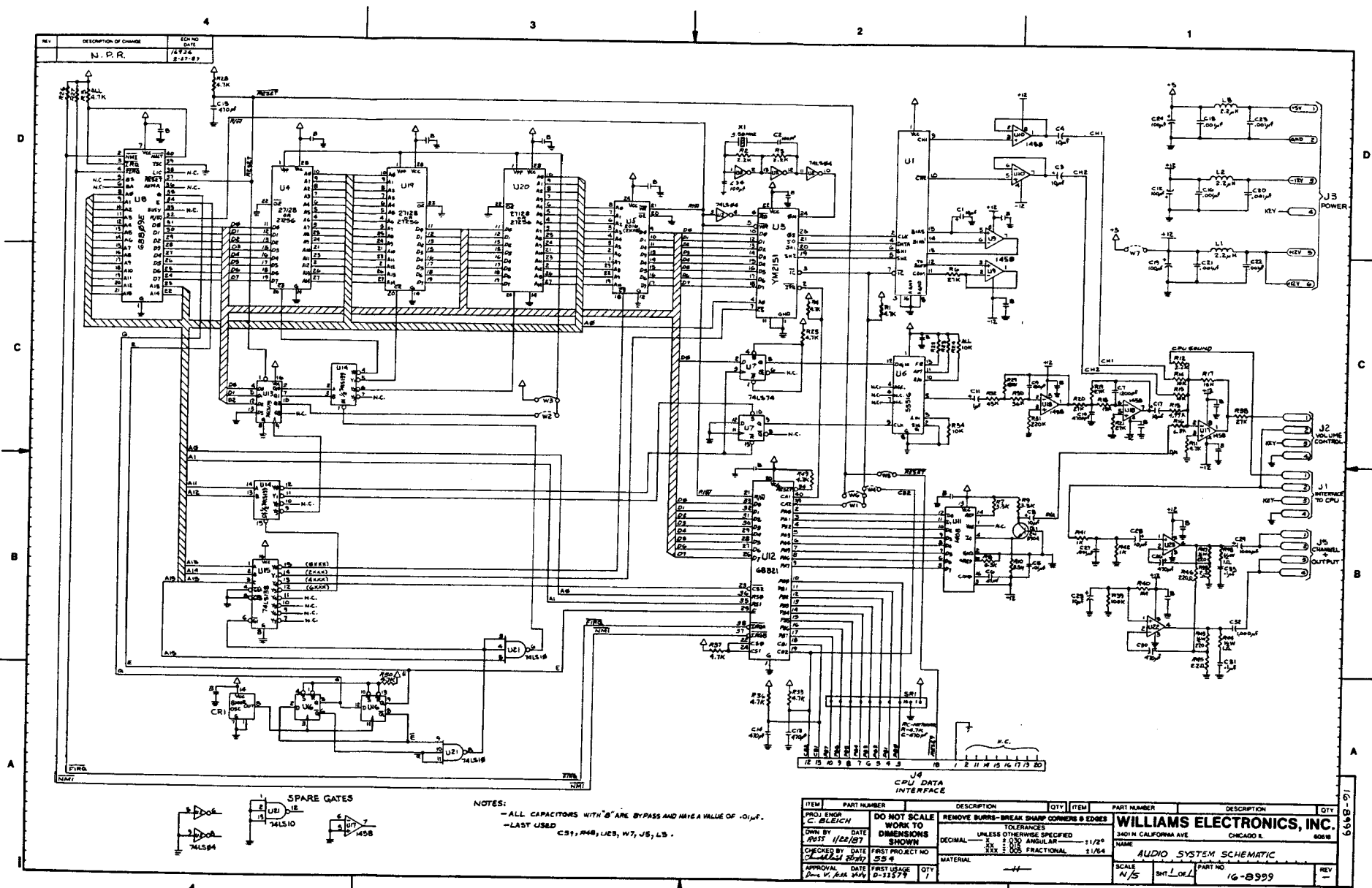
Cabinet Wiring Diagram



CPU Board



Solenoids and Special Switches Control Diagram

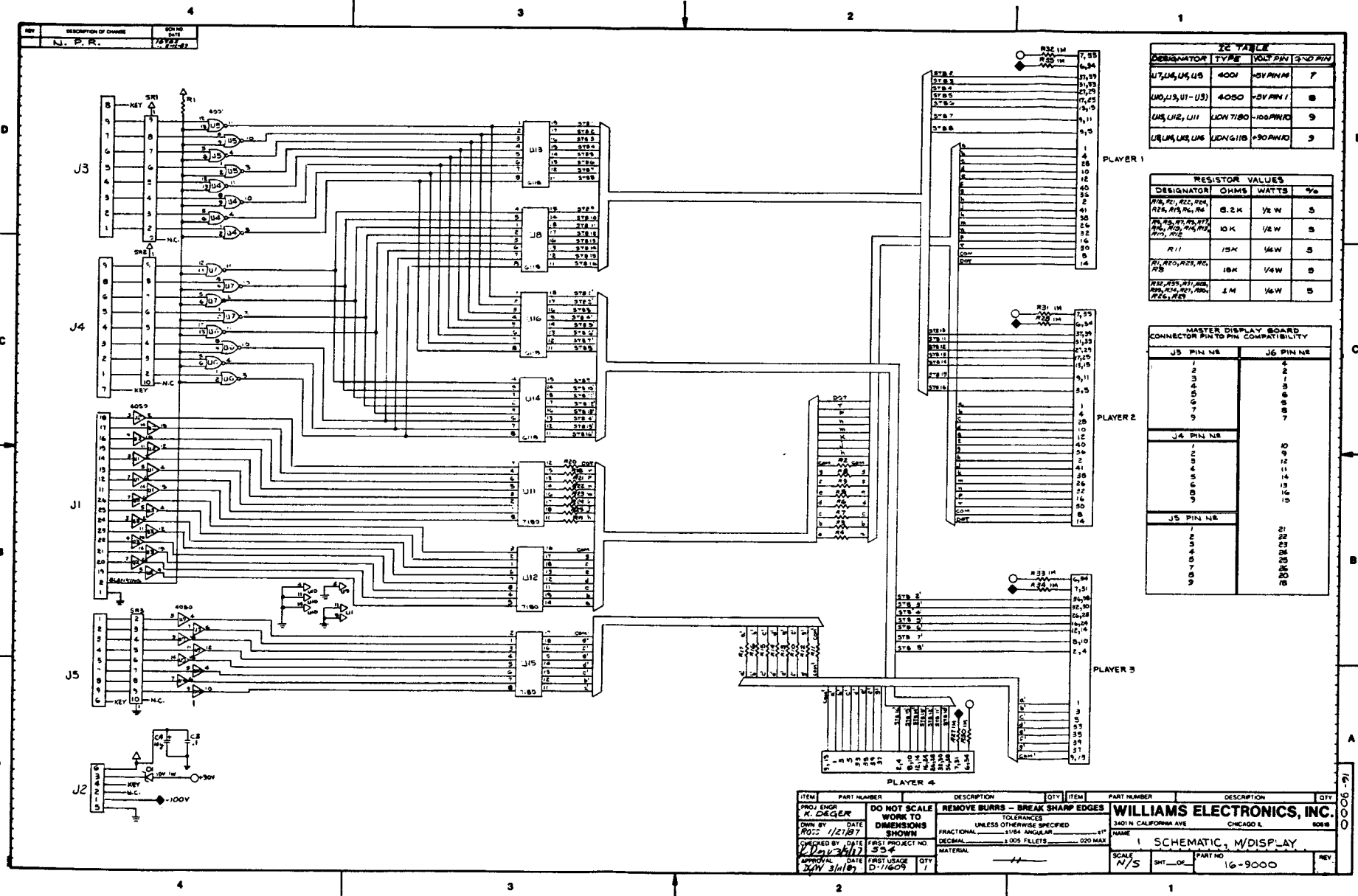


NOTES:
 - ALL CAPACITORS WITH '0' ARE BYPASS AND HAVE A VALUE OF .01µF.
 - LAST USED
 C51, R48, U2, W7, J5, L3.

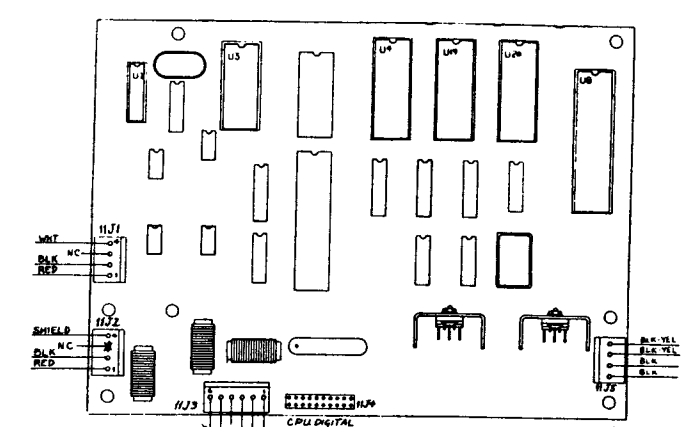
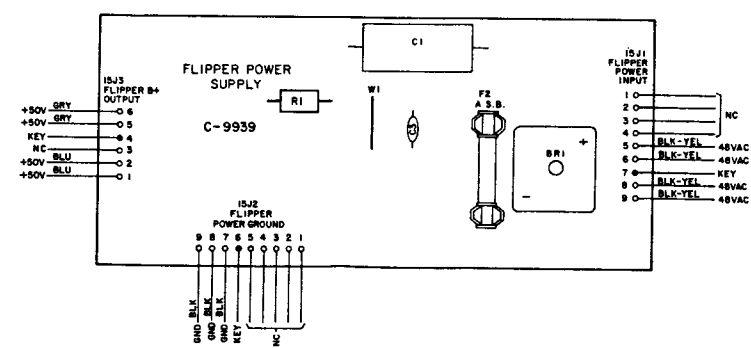
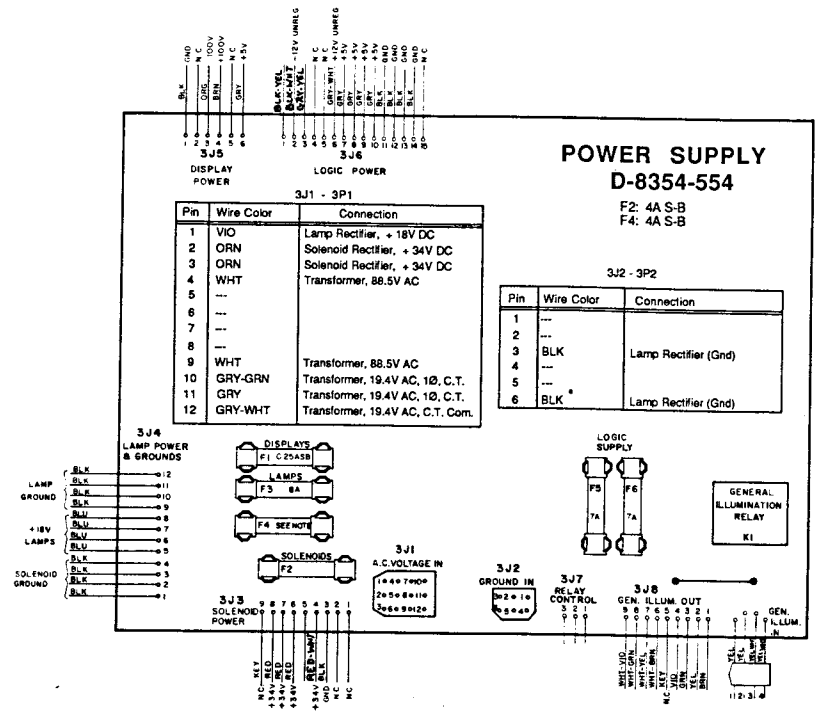
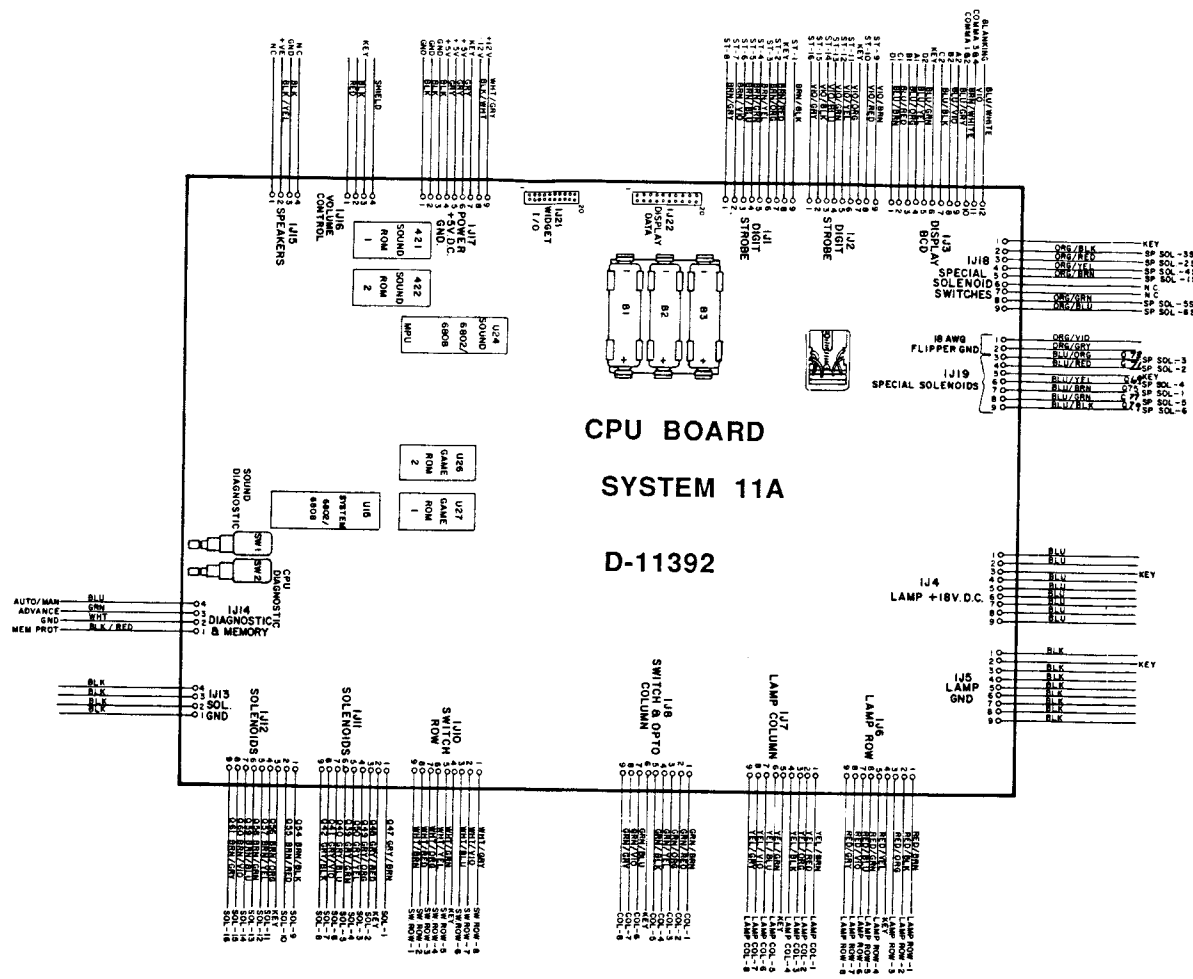
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	C. BLEICH	DO NOT SCALE WORK TO DIMENSIONS SHOWN		PART NUMBER	WILLIAMS ELECTRONICS, INC.		
DESIGNED BY	DATE	REMOVE BURRS - BREAK SHARP CORNERS & EDGES		3401 N. CALIFORNIA AVE	CHICAGO, ILL.	60618	6668-C-91
PRINT	1/22/87	TOLERANCES UNLESS OTHERWISE SPECIFIED		NAME	AUDIO SYSTEM SCHEMATIC		
CHECKED BY	DATE	DECIMAL .1 .030 ANGULAR ±1/2°		SCALE	N/S	SMT Loc	PART NO 16-8999
APPROVAL	DATE	FRACTIONAL 1/64		REV			
DATE	FIRST USAGE	MATERIAL					
DATE	QTY						

Audio Board (D-11581) Schematic

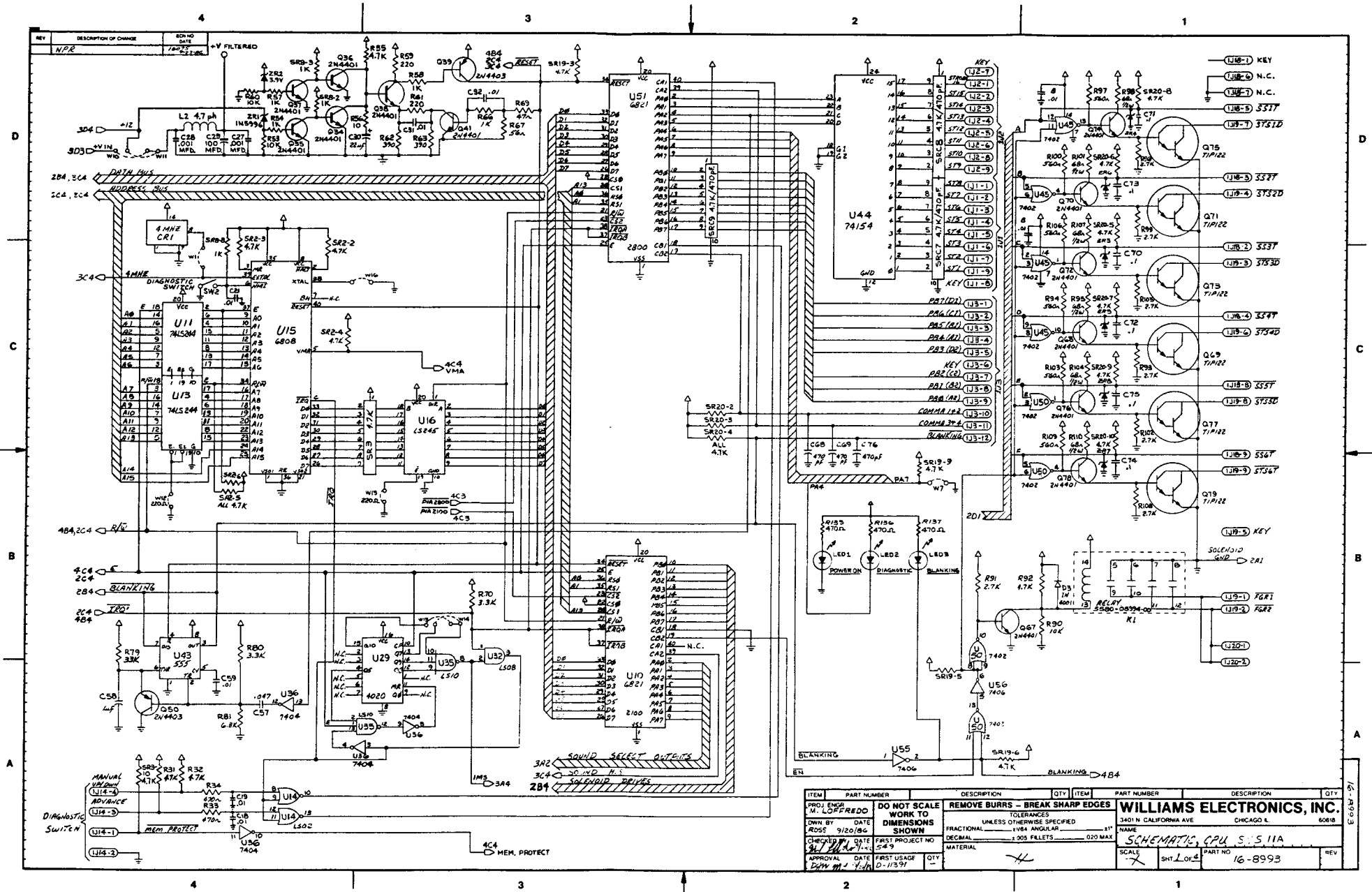
FIRE! 60



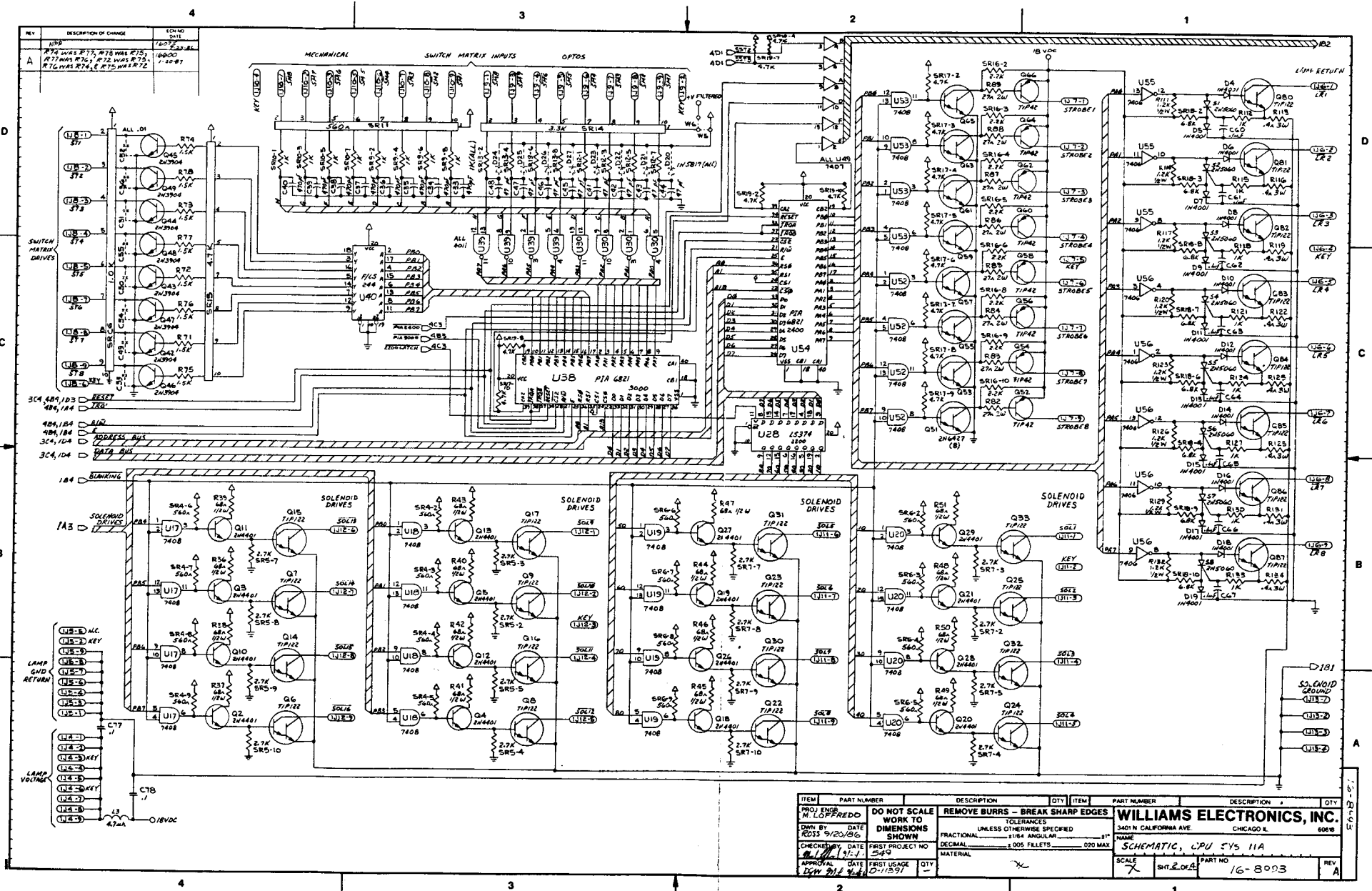
Alphanumeric Display Unit Board (D-11610) Schematic



Interboards Signals Diagrams



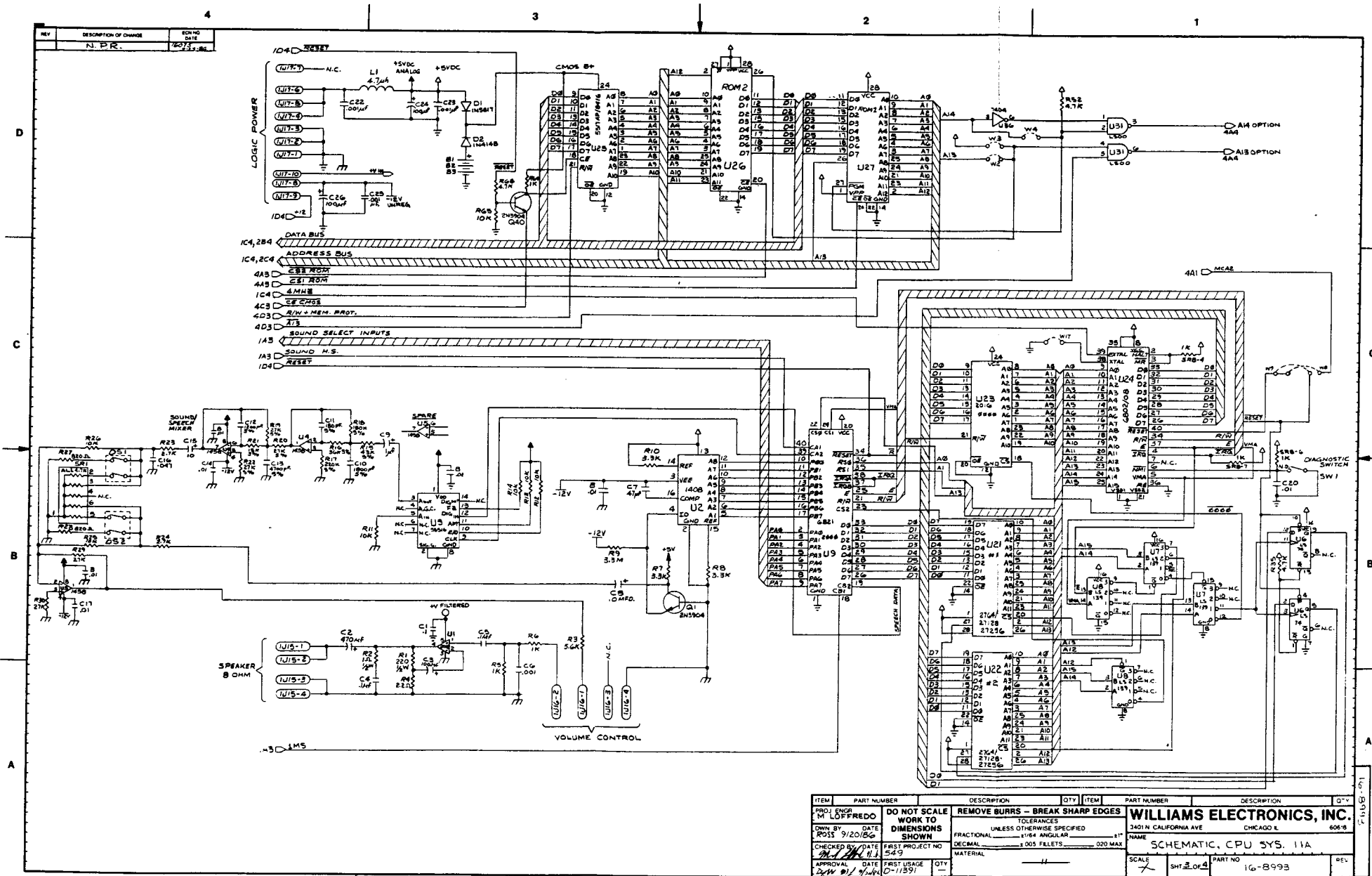
Schematic, System 11A CPU Board (16-8993, Sheet 1 of 4) FIRE! 63



Schematic, System 11A CPU Board (16-8993, Sheet 2 of 4)

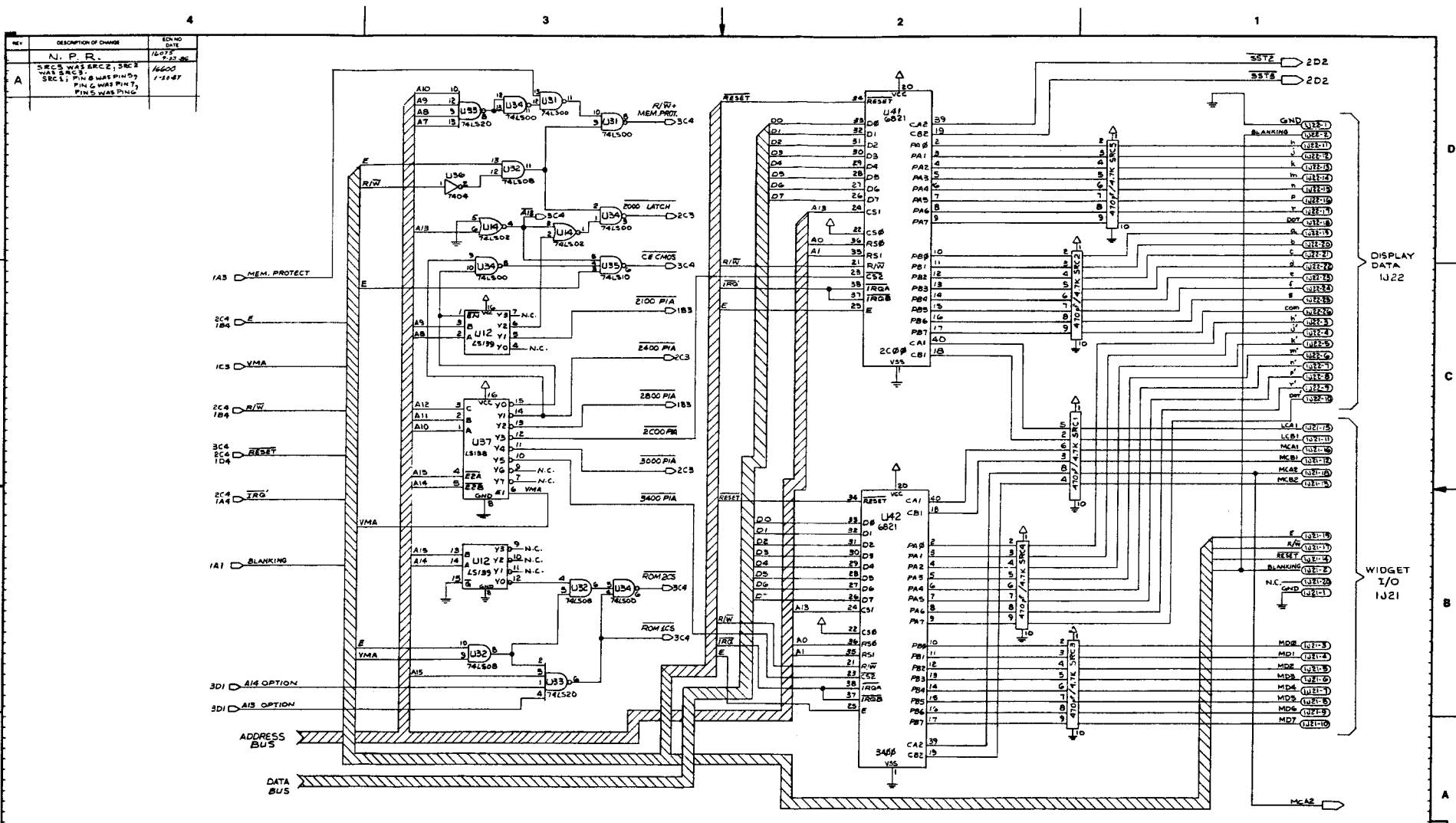
FIRE! 64

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	M. LOFFREDO	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
OWN BY	DATE	FRACTIONAL	UNLESS OTHERWISE SPECIFIED	TOLERANCES			
CROSS	9/20/86	DECIMAL	±0.05 FOLETS - 020 MAX				
CHECKED BY	DATE	FIRST PROJECT NO	549				
APPROVAL	DATE	FIRST USAGE	0-11-91				
WILLIAMS ELECTRONICS, INC. 2401 N. CALIFORNIA AVE. CHICAGO, IL 60618 SCHEMATIC, CPU 5/5 11A				SCALE 7X PART NO 16-8993 REV A			



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
<p>PROJ. ENGR. M. LOFFREDO DOWN BY DATE ROSS 9/20/86 CHECKED BY DATE 2/1/87 APPROVAL DATE 2/1/87</p>							
<p>DO NOT SCALE WORK TO DIMENSIONS SHOWN</p>				<p>REMOVE BURRS - BREAK SHARP EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED</p>			
<p>FRACTIONAL .1164 ANGULAR .020 MAX</p>				<p>MATERIAL 1.005 FALETS</p>			
<p>WILLIAMS ELECTRONICS, INC. 2401 N. CALIFORNIA AVE CHICAGO IL 60618 SCHEMATIC, CPU SYS. 11A SCALE 1:1 SHT 3 OF 4 PART NO 16-8993 REV</p>							

Schematic, System 11A CPU Board (16-8993, Sheet 3 of 4)

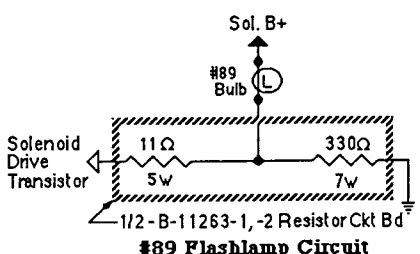
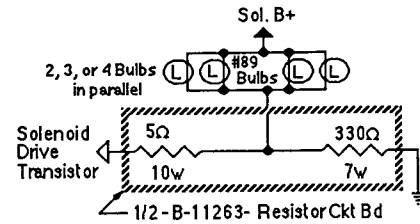
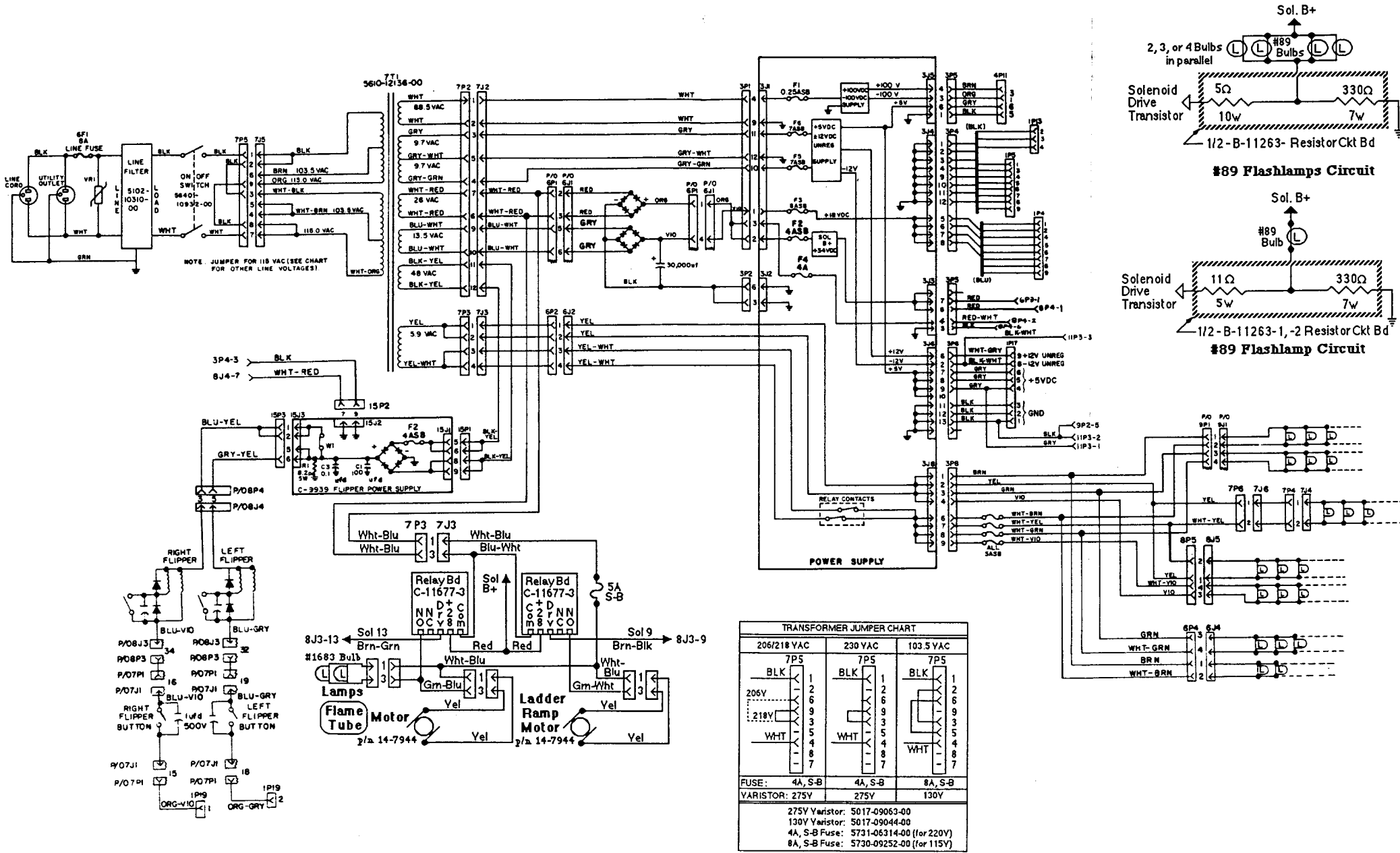


REV	DESCRIPTION OF CHANGE	ED. NO.	DATE
A	N. P. R. SRECS WAS SRC2, SRC3 WAS SRC3 SRECS 1, PIN 8 WAS PIN D5 PIN G WAS PIN T5 PIN S, WAS PIN G	16073	1/22/86
		16602	1-10-87

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	M. LOFFREDO	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS - BREAK SHARP EDGES			
OWN BY	DATE	FRACTIONAL	UNLESS OTHERWISE SPECIFIED	TOLERANCES			
CHECKED BY	DATE	DECIMAL	1/64 ANGULAR				
APPROVAL	DATE	FIRST PROJECT NO.	1.005 FILLETS				
		FIRST USAGE	.020 MAX				
		QTY					
WILLIAMS ELECTRONICS, INC.				3401 N. CALIFORNIA AVE. CHICAGO IL 60618			
SCHEMATIC, CPU SYS 11A				SCALE: N/S BHT 1.0x1.0 PART NO. 16-8993 REV. A			

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

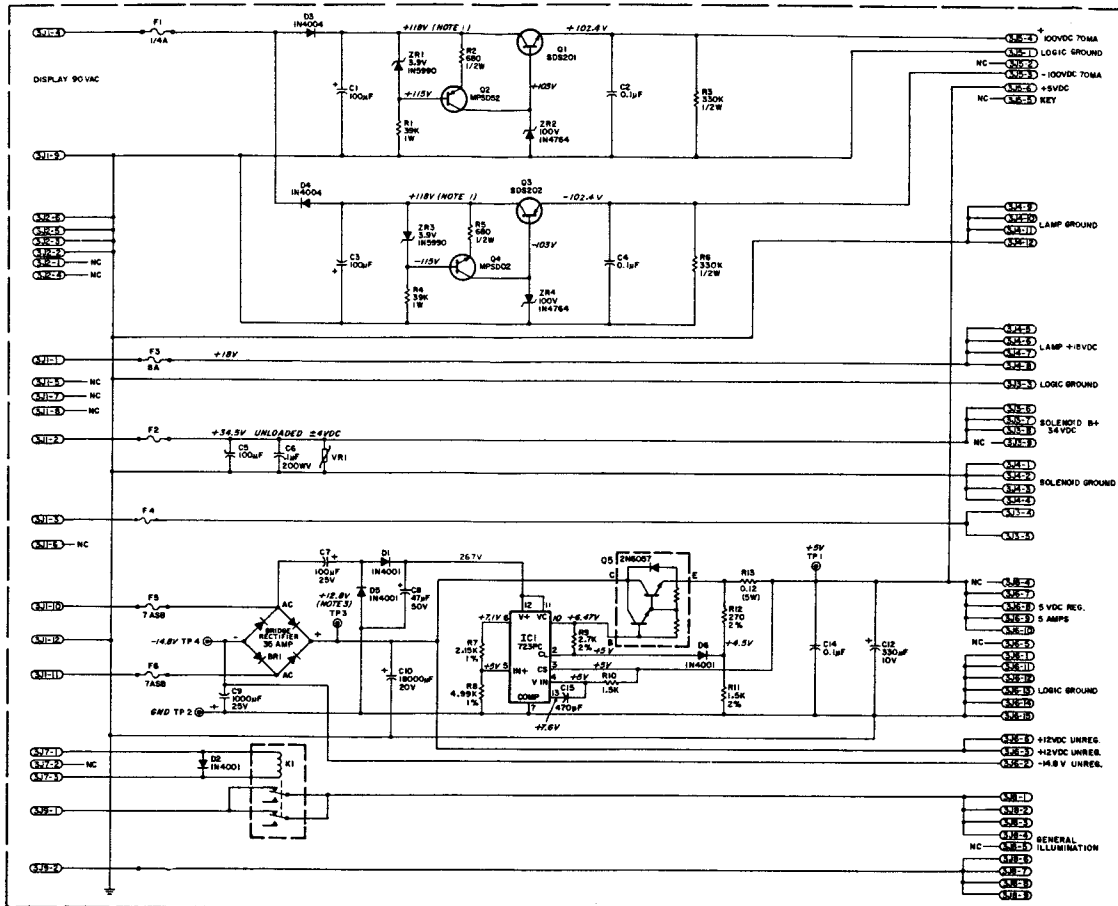
FIRE! 66



TRANSFORMER JUMPER CHART

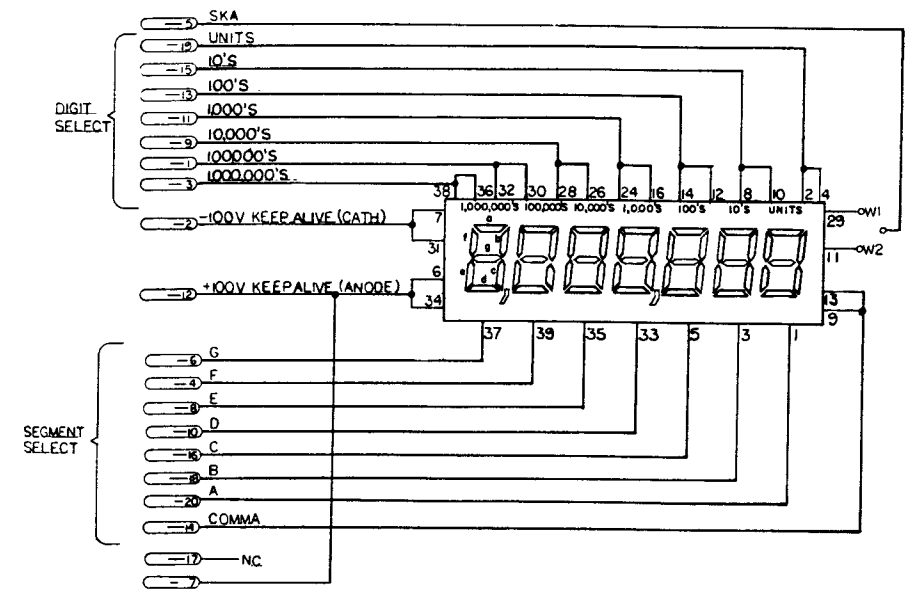
	206/218 YAC	230 YAC	103.5 YAC
7P5	BLK	BLK	BLK
	1	1	1
	2	2	2
	6	6	6
	9	9	9
206V	3	3	3
218V	4	4	4
	5	5	5
WHT	7	7	7
	8	8	8
	7	7	7
FUSE:	4A, S-B	4A, S-B	8A, S-B
VARIATOR:	275V	275V	130V
275V Varistor: 5017-09063-00			
130V Varistor: 5017-09044-00			
4A, S-B Fuse: 5731-06314-00 (for 220V)			
8A, S-B Fuse: 5730-09252-00 (for 115V)			

Power Wiring Diagram



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

FIRE! Switch-Matrix Table

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

WARNINGS & NOTICES

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

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