

Operations and Parts Information Manual

Bally

16-2009-101
September 1989

Now Surround!

GAME	P/N-U15 Game uP	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 uP	JUMPERS
Transporter	5400-09150-00	A-5343-2008-2	A-5343-2008-1	A-5343-2008-4	A-5343-2008-3	5400-09150-00	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, 18
Elvira	5400-09150-00	A-5343-2011-2	A-5343-2011-1	A-5343-2011-4	A-5343-2011-3	5400-09150-00	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, 18
Mousin' Around	5400-09150-00	A-5343-2009-2	A-5343-2009-1	A-5343-2009-4	A-5343-2009-3	5400-09150-00	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, 18

MOUSIN' AROUND

Solenoid Table

Sol. No.	Function	Solenoid Type	Wire Color	Connections		Driver Transt.	Solenoid Part Number Flashlamp Type d= Display Bd; p=Playfield	
				CPU Bd	Playfield/ Cabinet			
01A 3	Outhole Kicker	Switched	Vio-Brn	1P11-1	5J1-9: 5J4-9 (A)	Q33	AE-23-800	
01C 3	Right Flipper Flasher	Switched	Blk-Brn	(Gry-Brn)	5J5-9 (C)	Q33	#89 flashlamps	2p
02A 3	Ball Shooter Lane Feeder	Switched	Vio-Red	1P11-3	5J1-7: 5J4-8 (A)	Q25	AE-23-800	
02C 3	Left Flipper Flasher	Switched	Blk-Red	(Gry-Red)	5J5-8 (C)	Q25	#89 flashlamps	2p
03A 3	Trap 1 Up	Switched	Vio-Orn	1P11-4	5J1-6: 5J4-7 (A)	Q32	AE-26-1400	
03C 3	Left Side Flasher	Switched	Blk-Orn	(Gry-Orn)	5J5-7 (C)	Q32	#89 flashlamps	1p
04A 3	Trap 2 Up	Switched	Vio-Yel	1P11-5	5J1-5: 5J4-6 (A)	Q24	AE-26-1400	
04C 3	Back Panel Flasher	Switched	Blk-Yel	(Gry-Yel)	5J5-5 (C)	Q24	#906 flashlamp	1b
05A 3	Trap 1 Down	Switched	Vio-Grn	1P11-6	5J1-4: 5J4-5 (A)	Q31	SM1-28-800	
05C 3	Top Right Flasher	Switched	Blk-Grn	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamp	1p
06A 3	Not Used	Switched	Vio-Blu	1P11-7	5J1-3: 5J4-4 (A)	Q23		
06C 3	Right Ramp Flasher	Switched	Blk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#89 flashlamp	1p
07A 3	Knocker	Switched	Vio-Blk	1P11-8	5J1-2: 5J4-2 (A)	Q30	AE-23-800	
07C 3	Left Ramp Flashers	Switched	Blk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#89 flashlamp	1p
08A 3	Trap 2 Down	Switched	Vio-Gry	1P11-9	5J1-1: 5J4-1 (A)	Q22	SM1-28-800	
08C 3	Timer Flasher	Switched	Blk-Gry	(Gry-Blk)	5J5-1 (C)	Q22	#89 flashlamps	2p
09	Insert Board Gnl Illum Relay	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9: 2J4-3	Q17	5580-09555-01	4a
10	Playfield Gnl Illum Relay	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-09555-01	4a
11	Motor Relay	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	5580-12145-01	4b
12	A/C Select	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01	5
13	Kickback (L Outlane)	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	AE-24-900	
14	Ball Diverter	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800	
15	Center Flashers	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	#89 flashlamps	1p
16	Mouse Hole Exit	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-26-1200	
17	Left Jet Bumper	Special #1	Blu-Brn	1P19-7	5J3-7: 5J7-7	Q75	AE-23-800	
18	Left Kicker ("sling")	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500	
19	Right Jet Bumper	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800	
20	Right Kicker ("sling")	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500	
21	Lower Jet Bumper	Special #5	Blu-Grn	1P19-8	5J3-2: 5J7-2	Q77	AE-23-800	
22	Top Lanes Gate	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	SM2-35-4000	
-	<u>Right Flipper</u>	-	Orn-Vio	1P19-1	2J5-5: 2J10-7	-		
-	Lower Right Flipper	-	[Blu-Vio]	2	[2J10-1: 2J8-15]	-	FL11630/50VDC	
-	<u>Left Flipper</u>	-	Orn-Gry	1P19-2	2J5-4: 2J10-8	-		
-	Lower Left Flipper	-	[Blu-Gry]	2	[2J10-2: 2J8-4]	-	FL11630/50VDC	

Notes 1. Wire colors, except flipper Orn-Vio and Orn-Gry are ground connections (to 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" circuits are pulsed, when Sol. 12 is de-energized; "C" circuits are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the J1-terminal connection listed for the Aux Power Driver Bd. which controls the device pulsing by Sol. 12. 4. Relay is mounted on Relay bd. (4a) C-11998-1; (4b) C-11902-1. 5. Relay mounted on Aux. Power Driver Bd., D-12247.

MOUSIN' AROUND

MOUSIN' AROUND GAME PLAY RULES

GOAL

The main object of *MOUSIN' AROUND* is to steal the Cheese, play Multi-ball™ and, score the Jackpot by trapping the Mice and sending the last one home to the Mouse Hole.

PLUNGER SKILL SHOT

Sending the ball through the Top Lanes when lit scores 100,000 points times the ball you are on. Therefore you earn 100,000 for ball 1; 200,000 for ball 2; 300,000 for ball 3, etc.

CHEESE FEATURE

Any ramp spots a letter in Cheese. After completing C-H-E-E-S-E the Mouse Hole opens for you to build your Jackpot. Then you are awarded a Cheezy Bonus, (Mystery Score anywhere from 100 to 500 points, Extra Ball, Special or, 1 Million Points). Any cheese taken will count for Outhole Bonus.

2X & 3X MULTIPLIER

Complete the Top Lanes once and earn the 2X Bonus Multiplier. Complete the Top Lanes twice and earn the 3X Bonus Multiplier.

MULTI-BALL™

Spell M-O-U-S-E T-R-A-P, either by hitting the stand-up Mouse Trap Targets or, by getting the ball through the lit Return Lanes. Spelling M-O-U-S-E T-R-A-P sets the Traps that lock the balls. Trap 2 balls and the 3rd ball releases them when it is put into play.

JACKPOT

After Multi-ball™ is achieved, Traps remain up, you must trap the Mice again and send one home to the Mouse Hole to be awarded the Jackpot. Once the Jackpot is collected you can try for the Jackpot again & again. Jackpot resets for the next ball if collected.

MILLION

Hitting the Center Targets in sequence lowers the targets and, lights the Kickback. The Cheese Loop enables the Left & Right Ramps to spot letters in Million. After M-I-L-L-I-O-N is spelled, the Mouse Hole opens so you can collect 1,000,000 points.

EXTRA BALL

Shooting the Left Trap Lane consecutively lights ramps for Extra Ball.

DOUBLE PLAYFIELD SCORES

When making the Right or Left Ramp shots twice in a row, the Cheese Target starts flashing for increase value. Make the shot and Double Scoring has started.

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Game Operation and Test Information

MOUSIN' AROUND ROM SUMMARY

IC	DESCRIPTION	TYPE	IDENTIFIER	BOARD	PART NUMBER
Game ROM 1	32K x 8 ROM	27256	U27	CPU	A-5343-2009-2
Game ROM 2	32K x 8 ROM	27256	U26	CPU	A-5343-2009-1
Sound ROM 1	32K x 8 ROM	27256	U21	CPU	A-5343-2009-4
Sound ROM 2	32K x 8 ROM	27256	U22	CPU	A-5343-2009-3
Music/Speech ROM	64K x 8 ROM	27256	U4	AUDIO	A-5343-2009-5
Music/Speech ROM	64K x 8 ROM	27256	U19	AUDIO	A-5343-2009-6
Music/Speech ROM	64K x 8 ROM	27256	U20	AUDIO	A-5343-2009-7

Connector Identification

Since *MOUSIN' AROUND* is using WILLIAMS ELECTRONICS GAMES System 11B, a new connector identification technique must be introduced. Each plug or jack receives a prefix number (which identifies the circuit board), followed by a letter ("J" or "P"), 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 3 (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.

Other game components may also have similar prefixes preceding their designator to clarify their locations or related circuit.

Prefix numbers for the System 11B circuit boards and other major assemblies are listed below. A prefix number may precede a component designator to identify its associated unit (e.g., connector1J1).

1 - CPU	6 - Backbox
2 - Master Interconnect	7 - Cabinet
3 - Backbox Power Supply	8 - Playfield
4 - Alphanumeric Display	9 - Insert Board
5 - Aux Power Driver	10 - Sound Board

Circuit Boards

System 11B Circuit Boards for *MOUSIN' AROUND* are in the backbox. They are accessible by unlocking the Backbox lock, removing the Backbox glass, unlatching the Insert Board (with lamps and the Digital Display Boards), and swinging it open.

Lamp circuit boards are mounted on the Playfield and the Insert Board.

CONTROL BOARD

The System 11B CPU Board (p/n D-11883-2009) must be equipped with the ROMs specified in the *MOUSIN' AROUND* ROM Summary. CPU Board jumpers W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, and W19 must be connected.

SOUND BOARD

The Sound Board is p/n D-11581-2009, including ROMs and micro-processor.

DISPLAY BOARD

MOUSIN' AROUND has two Display Boards. The BALLY Lo-Display Board is p/n D-12502-1, and the BALLY Hi-Display Board is p/n D-12706.

POWER SUPPLY BOARD

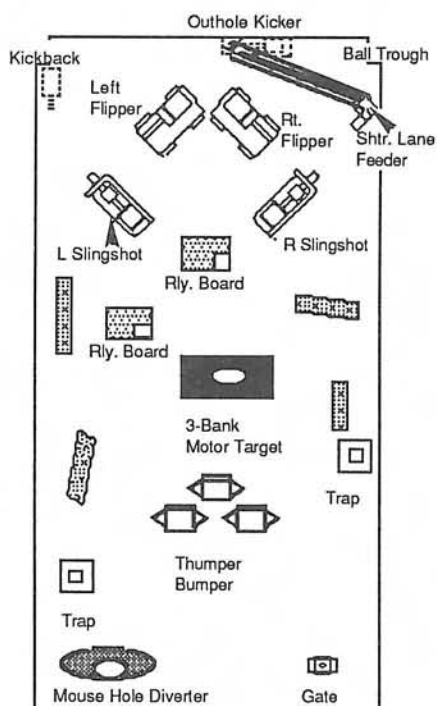
The Power Supply Board is p/n D-12246.

AUX POWER DRIVER BOARD

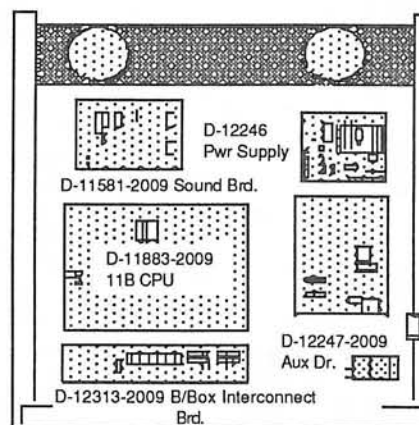
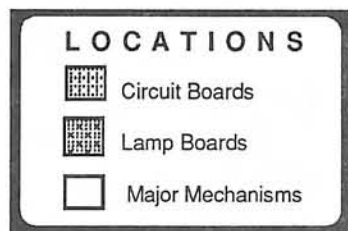
The Aux Power Driver Board is D-12247-2009.

MASTER INTERCONNECT BOARD

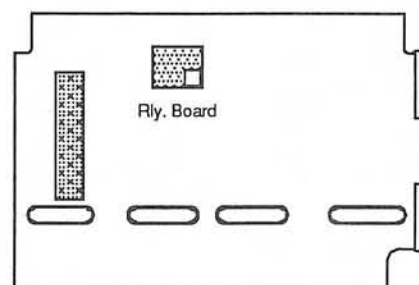
The Master Interconnect Board is D-12313-2009.



Underside of Playfield,
Viewed from Raised Position



Display Panel, Rear View



Insert Board, Inner Side View

Figure 1. Locations Diagram - Game Circuit Boards and Major Mechanisms.

Game Control Locations

Figure 2 shows the locations of the following switches, except for the last two (CPU and Sound Diagnostic switches, which are shown in the Circuit Board Locations Diagram).

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. *MOUSIN' AROUND* allows the operator to control all game adjustments, obtain bookkeeping information, and diagnose problems, using only three switches mounted on the inside of the coin door, along with 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 text discussing Game Status Displays and the Test/Diagnostic Procedures for details concerning button 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.

On the previous page, the Circuit Board Locations Diagram shows the locations of the two CPU Board switches (left edge of CPU Board, Backbox View).

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.

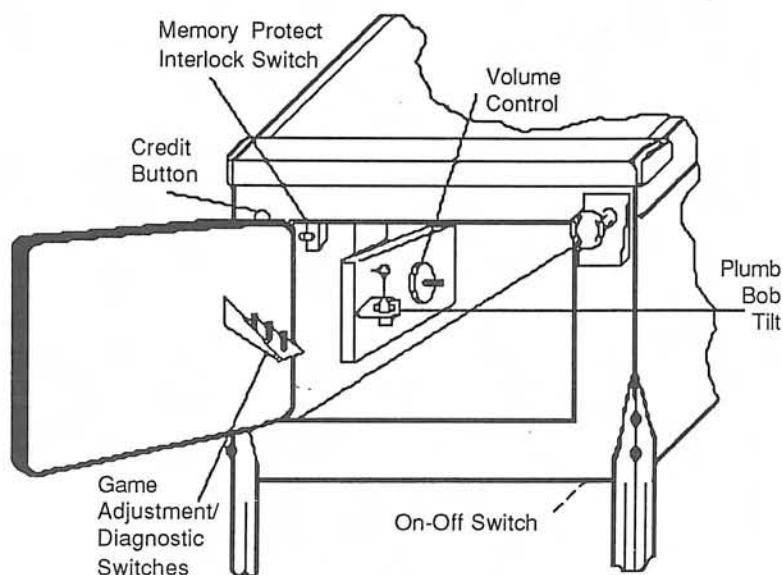


Figure 2. Control Locations

Pinball Game Assembly Instructions

INSTALLATION PROCEDURE

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

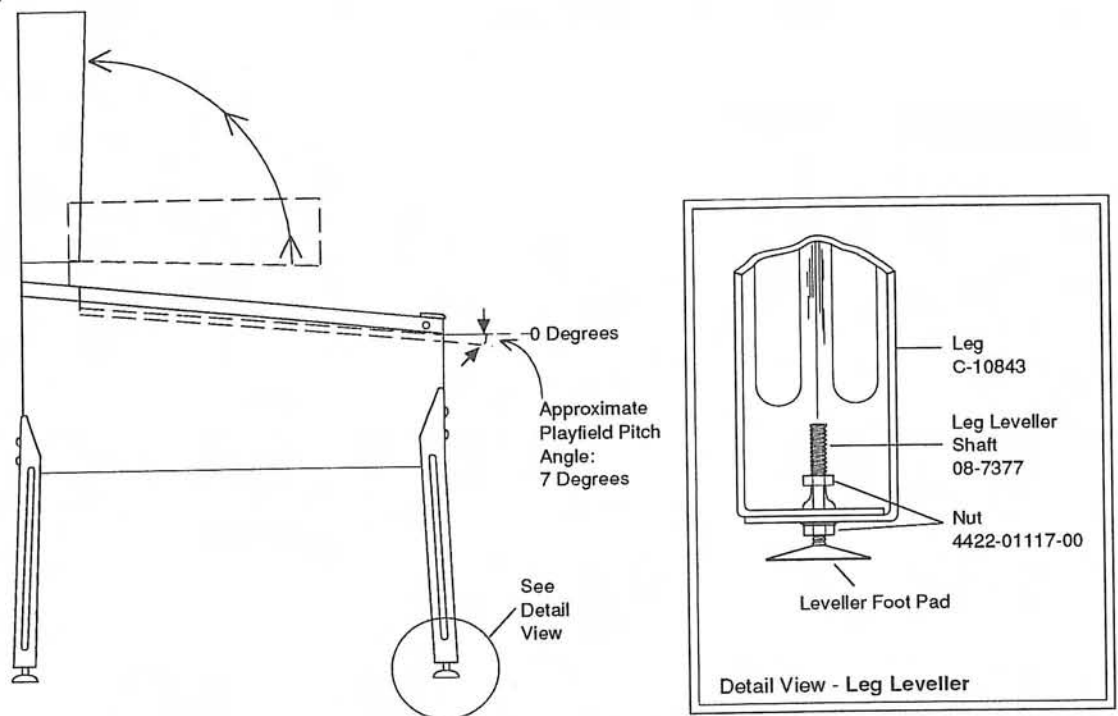


Figure 3. Pinball Assembly, Playfield Pitch Angle, and Leg Leveler Details.

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.

4. Raise the hinged backbox upright and stabilize it into position. Unlock the backbox, and remove the backbox glass, storing it carefully to avoid scratches. Remove the shipping block holding the Insert Board. This allows access to the bolt holes used for securing the backbox upright. Install the mounting bolts, split lockwashers, and flat washers through the bottom holes of the backbox into the threaded fasteners in the cabinet to secure the backbox. Close and latch the Insert Board, and install the backbox glass, and lock the backbox.

WARNING

NEVER transport a pinball game with 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.

5. Extend each leg leveller 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.

6. Adjust the leg levellers for proper playfield level (side-to-side) and playfield pitch angle (incline) of approximately 7 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 leveller shaft to maintain this setting, as shown in Figure 3.

CAUTION

Playing pitch angle adjustments can affect the operation of the plumb bob tilt, inside the cabinet. The plumb bob weight is among the parts in the cash box; the operator should install the weight and adjust the tilt mechanism for proper operation, after completion of the desired playfield pitch angle setting.

7. Move the game into the desired location: recheck the level and pitch angle of the playfield.

8. Verify that the required number of balls are inside the game. *MOUSIN' AROUND* uses three (3) balls.

9. 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., if the operator does not change the Factory Setting).

Open the coin door 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

The SYSTEM 11B game program has a great capability to aid the operator and service personnel: At game Turn-On (and also at the beginning of the Test/Diagnostic Procedures), the player score displays now signal with a message, "Press ADVANCE for Report", that the game program has detected a possible problem with the game. Usually, this report indicates that at least one switch has NOT been actuated during ball play for 90 balls (apx. 30 games). However, the game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep MOUSIN' AROUND earning good profits! More information is available in the Test/Diagnostic Procedures text describing the Switch Testing.

ATTRACT MODE*

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

- A. Recent highest scores*;
- B. A "custom message";
("BE THE NEXT BIG CHEESE-PLAY...MOUSIN' AROUND")*;
- 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.

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.

SLAM TILT

Actuating the Slam Tilt switch on the coin door inside the cabinet ends the current game; *MOUSIN' AROUND* then proceeds to the Game Over Mode. With the actuation of the playfield tilt switch, 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

Game Status Displays

INTRODUCTION

MOUSIN' AROUND 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 two-letter abbreviations for these classes appears in the score display, while the system microprocessor for the *MOUSIN' AROUND* 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. Player 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
MOUSIN' AROUND		2009 LA-x*	ID00

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

The game is named in the Player 1 and 2 score display. The ROM revision level appears in the Player 3 score display. The Player 4 score display shows the status display mode in abbreviated form, Id. The Player 4 score display also shows the status display mode item (00) for this particular display. Pressing advance (to Id 01) once more shows the Game Revision information.

Player 1	Player 2	Player 3	Player 4
DOMESTIC	LEVEL 1	09-05-89	ID01

The country is named in the Player 1 score display. The Production Level appears in the Player 2 score display. The game's release date appears in the Player 3 score display and the status display mode information is shown in the Player 4 display.

Pressing ADVANCE once more causes the Id 02 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. Fifty-four audit entries are now available. Calculation of the various factors is no longer necessary because the System 11B 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 *MOUSIN' AROUND* Audit Table lists the 54 items of the Audit Information portion of the *MOUSIN' AROUND* 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 54 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.)

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 *MOUSIN' AROUND* Game Status Displays, as listed in the *MOUSIN' AROUND* 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.

The *MOUSIN' AROUND* Game Adjustment Table lists the 70 items of the Adjustment Information portion of the *MOUSIN' AROUND* Game Status Displays. Presentation of the displays is similar to that for the Audit Information (that is, the player 1 and

MOUSIN' AROUND AUDIT TABLE

Audit Item (Right)	Descriptive Phrases (Left Display)	Audit Factor ¹ Value (Right)
AU 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	MINUTES OF PLAY (Minutes of Play)	
19	BALLS PLAYED	
20	REPLAY1 AWARDS	
21	REPLAY2 AWARDS	
22	REPLAY3 AWARDS	
23	REPLAY4 AWARDS	
24	1 PLAYER GAMES	
25	2 PLAYER GAMES	
26	3 PLAYER GAMES	
27	4 PLAYER GAMES	
28	BURN IN CYCLES	
29	MULTI-BALL ^M (# of times for Multi-ball play)	
30	JACKPOT AWARDS (# of times "Jackpot" awarded)	
31	MILLION AWARDS (# of times Million awarded)	
32	CHEEZY BONUS (# of times "Cheezy Bonus" awarded)	
33	DOUBLE PLAYFIELD (# of times Double Playfield Value awarded)	
34	2X MULTIPLIER AWARDS (# of times 2X Bonus lit)	
35	3X MULTIPLIER AWARDS (# of times 3X Bonus lit)	
36	OUTLANE AWARDS (# of times 250K Outlane awarded)	
37	CONSOL. EXTRA BALL (# of times Consol. Extra Ball awarded)	
38	CHEEZY EXTRA BALLS (# of Extra Balls from Cheezy Bonus)	
39	H.S.RESET COUNTER	
40	0.0-0.4 MIL. SCORE (# of games <500K)	
41	0.5-0.9 MIL. SCORE (# of games ≥500K, <1M)	
42	1.0-1.4 MIL. SCORE (# of games ≥1M, <1.5M)	
43	1.5-1.9 MIL. SCORE (# of games ≥1.5M, <2.0M)	
44	2.0-2.9 MIL. SCORE (# of games ≥2.0M, <2.9M)	
45	3.0-3.9 MIL. SCORE (# of games ≥3.0M, <3.9M)	
46	4.0-4.9 MIL. SCORE (# of games ≥4.0M, <4.9M)	
47	5.0-5.9 MIL. SCORE (# of games ≥5.0M, <5.9M)	
48	6.0-7.9 MIL SCORE (# of games ≥6.0M, <7.9M)	
49	8.0-9.9 MIL SCORE (# of games ≥8.0M, <9.9M)	
50	10-99 MIL. SCORE (# of games ≥10.0M, <99 M)	
51	AV. MIN. GAME TIME (Avg Game Time in minutes)	
52	LEFT DRAINS (# of drains through the left outlane)	
53	RIGHT DRAINS (# of drains through the right outlane)	
54	NOT USED	
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.		

MOUSIN' AROUND Game Adjustment Table

Adjustment Item (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Factory Setting	
		Domestic (US/Can.)	W.Ger./ European
Ad 01	AUTO REPLAY ¹ or FIXED REPLAY ¹	10 (%)	ON
02	REPLAY START (or REPLAY LEVEL 1 ¹)	SCORES ¹	
03	REPLAY LEVELS (or REPLAY LEVEL 2) ¹	6,000,000	02
04	(REPLAY LEVEL 3) ¹	02	
05	(REPLAY LEVEL 4) ¹	(see text)	
06	REPLAY AWARD	(see text)	
07	SPECIAL AWARD	Credit	
08	MATCH FEATURE	Credit	
09	BALLS/GAMES	10 (%)	
10	TILT WARNING	03	
11	MAXIMUM EXTRA BALL	03	
12	MAXIMUM CREDITS	03	
13	HIGHEST SCORES	10	30
14	BACKUP HI. SCR. 1	On	
15	BACKUP HI. SCR. 2	8,000,000	8,500,000
16	BACKUP HI. SCR. 3	7,500,000	8,000,000
17	BACKUP HI. SCR. 4	7,000,000	7,500,000
18	HI. SCR. 1 CREDITS	6,500,000	7,000,000
19	HI. SCR. 2 CREDITS	01	03
20	HI. SCR. 3 CREDITS	01	00
21	HI. SCR. 4 CREDITS	01	00
22	H. S. RESET EVERY	01	00
23	FREE PLAY	3,000	1,000
24	U.S.A. 1 COINAGE (1 COIN 1 PLAY) ^{2,3,6}	NO	
25	LEFT UNITS	USA 1	GERMAN 2
26	CENTER UNITS	01	06
27	RIGHT UNITS	04	12
28	UNITS/ CREDIT	01	30
29	UNITS/ BONUS	01	05
30	MINIMUM UNITS	00	00
31 - 48	Game-specific Adjustments (detailed in text and the Game Adjustment Setting Comparison Table)		
49 ⁴	CUSTOM MESSAGE	ON	
50	DISPLAY AU (01 - 04)	YES	
51 - 52	NOT USED		
53 - 58 ^{5,6}	Special Adjustments- See text for 53-58 details.		
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 ⁷	INSTALL FACTORY	NO	

NOTES:

- 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 the next 500 games played. Item 03 permits setting up four replay levels, 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; install their replay level scores. Turn off any replay level by setting 00 as its value.
- Phrase in parentheses is Factory Setting. Phrase appears in player 2 and 4 displays. Press Credit button to change setting of the game pricing of item 24.
- To change country OR coinage setting, press Credit button to obtain 24 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.
- To install Custom Message, press flipper button for alphabet and special characters. Press Credit button for next message letter or character.
- Special Preset Adjustment, whose effects are noted in the Game Adjustment text.
- Refer to **Pricing Table** and text describing these items.
- Approximates Ad 64, yet includes all factors listed in Factory Setting column, not just Ad 31 through 47 provided by Ad 64.

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.

The *MOUSIN' AROUND* Game Adjustment Setting Comparison Table shows the five game 'difficulty' Adjustment Items (ranging from Ad 62 - Extra Easy through Ad 66 - Extra Hard). Installing any one of these 'difficulty' Adjustments causes the values shown for each of the included game play Adjustment Items to be installed as a group, changing the level of play from one difficulty level to another. The owner/operator can use the information provided by the Audit Table items to determine whether the 'difficulty level' for this game in this location needs to change to obtain a higher level of earnings from the game or to provide a greater challenge to the location's players.

Once the 'difficulty level' is changed, a careful review of the Audit Items will reveal whether the change has achieved this higher-earnings goal. Sometimes, one (or more) of the Adjustment Items needs further change to keep the number of plays high, while still keeping the earnings level high.

Mousin' Around

Game Adjustment Comparison Table for US/ Canadian/ French Games

Adj #	Adj Description	Extra Easy 62	Easy 63	Medium Ad (Factory) 64	Hard 65	Extra Hard 66
31	1/2 PRICE BUY-IN	NO	NO	NO	NO	NO
32	KICKBACK	EASY	EASY	MEDIUM	HARD	EX. HARD
33	MOTOR BANK	EX. EASY	EASY	HARD	HARD	EX. HARD
34	SPELL MOUSETRAP	EASY	EASY	EASY	HARD	EX. HARD
35	BUILD MILLION	EX. EASY	EASY	MEDIUM	HARD	HARD
36	OUTLANES	EX. EASY	EASY	MEDIUM	HARD	HARD
37	OUTHOLE BONUS MEM.	YES	YES	YES	YES	NO
38	EX. BALL LIT MEMORY	YES	YES	YES	YES	NO
39	CHEESE MEMORY	YES	YES	YES	YES	NO
40	DOUBLE PFLD. TIMER	25 SEC	20 SEC	15 SEC	10 SEC	5 SEC
41	BIG LOOP TIMER	5 SEC	4 SEC	3 SEC	2 SEC	1 SEC
42	JACKPOT TIMER	25 SEC	20 SEC	15 SEC	10 SEC	5 SEC
43	EX. BALLS/GAME	20%	20%	20%	20%	20%
44	SPECIALS/GAME	2%	2%	2%	2%	2%
45	FLASH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
46	BIG LOOP BEGIN LEVEL	EX. EASY	EASY	MEDIUM	HARD	EX. HARD
47	BALL TIME	40 SEC	40 SEC	40 SEC	40 SEC	40 SEC
48	ATTRACT SOUNDS	YES	YES	YES	YES	YES

Game Adjustment Procedure

Adjustment Items 01 through 70

The coin door must be open to access the Game Adjustment/Diagnostic switches. All readings and setting changes require operation of these coin door switches. Some setting changes utilize the Credit button; Adjustment #49 also uses the flipper buttons. Additional text describing the game adjustment items follows this procedure; the value of the Factory Setting for each Game Adjustment item is in the preceding *MOUSIN' AROUND* Game Adjustment Table.

1. Use AUTO-UP and press ADVANCE. The Id 00 display initially appears. Press ADVANCE until the Player 3 display indicates Ad 01. If the factory setting has not changed, the Player 1 and 2 Score displays indicate AUTO REPLAY, and 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 Game Adjustment Item number showing in the Player 3 display, increase the setting 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 the Game Adjustment Items have been made. The preceding Game Adjustment Table consolidates the Factory Settings into one grouping.

(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 "DONE" 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 difficulty in the Game Adjustment Setting Comparison Table, which precedes the '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. *MOUSIN' AROUND* now goes to the Game-Over Mode.
- B. To restore the Factory Settings for Game Adjustment Items (as listed in the Game Adjustments Table), zero all audit (bookkeeping) totals, and return to Game-Over Mode, use AUTO-UP or MANUAL-DOWN to display Ad 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. *MOUSIN' AROUND* now zeroes ALL Audit Item totals and changes ALL Game Adjustment Items 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 Protect 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.

Details of Adjustment Items 01 through 70

▲ 01 Auto Replay (or Fixed Replay)

Of the two options, AUTO REPLAY is the percentage of replays automatically awarded per game. The game program aids a pinball's initial installation by causing a comparison of the value of the Replay Level to the value of all players' scores every 50 games. At each comparison, the program increases (or decreases) the Replay Level by an amount necessary to achieve the replay percentage specified either via the factory setting or later operator selection. Use the Credit button to change the percentage within the range of 5 to 25 (%), 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). *MOUSIN' AROUND* 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 initial Factory Setting is listed in the Game Adjustment Table. The range of settings is 800,000 through 9,800,000 (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), this is the number of replay levels in a game. The option range is one, two, three, or four replay level(s). When the operator chooses two replay levels, *MOUSIN' AROUND* 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. *MOUSIN' AROUND* 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. *MOUSIN' AROUND* automatically bypasses this adjustment.

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

▲ 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).
- 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).

▲ 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).
- 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'. 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.
- 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 range of this setting is 1 through 9.

▲ 10 Tilt Warning

The operator can specify the 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.

▲ 11 Maximum Extra Ball

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:

- 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.

▲ 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 10. Reaching the specified setting prevents the award of additional credits by game play. Coin purchases do continue to accumulate and are displayed.

▲ 13 Highest Scores

The operator can specify (via the Credit button) whether the game is to maintain a record of the four highest scores achieved to date. The choices are:

- Off - NO high scores are recorded.
- On - The four highest scores are stored in memory for use by Game Adjustment 22.

▲ 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 game automatically restores this value, 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. 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. 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. 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.

▲ 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 to 03.

▲ 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.

▲ 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.

▲ 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 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 250 to 24,750 games (in increments of 250).

▲ 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. |
| Yes | - | Game play is free; no coin is required. |

▲ 24 Coinage Selections

The operator can specify (via the Credit button) any of the 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.

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.

▲ 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 of these coin units matches, or exceeds, the Units per Credit value by a multiple (or more, coin units) of the specified Units per Credit value, the Credits display shows the proper number of Credits. The coin unit counter retains any remaining coin units, until the start of a game; then, the coin unit counter is cleared (its contents are zeroed).

▲ 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.

▲ 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, by setting this value to 02 (or more). A setting of 01 allows the Credits display to show fractional coin units.

The System 11B game program defines the following 18 Adjustment Items as "game-specific"; that is, they are unique for each game. The Game Designer/Engineer/Programmer team members work together to use these as controlling factors for game play. By varying the setting of these Adjustment Items, it is possible to "fine-tune" a game to suit a particular location, enabling the owner/operator to reap maximum earnings, while still providing the players with sufficient challenge to keep them playing.

▲ 31 1/2 Price Buy In

The operator can choose (via the Credit button) whether the player is allowed to 'buy-in' subsequent games at 1/2 price. The number of games offered at 1/2 price is determined by the number of players in the previous game; that is, if the previous game had 3 players, 3 credits can be purchased for 1/2 price. NOTE: This requires that the left coin slot is always the smallest denomination of coins.

When these conditions exist, the choices for Ad 31 are:

Yes - The player has 10 seconds to 'buy-in' the next game(s) at 1/2 the original cost.

No - The 'buy-in' is not available.

▲ 32 Kickback

The operator can choose (via the Credit button) the difficulty for obtaining the Left Outlane Kickback. The choices are:

Easy	(Liberal) On at the start of every ball.
Medium	On at game start with ball to ball memory.
Hard	Off at game start with ball to ball memory.
Ex. Hard	(Conservative) Off at start of every ball.

▲ 33 Motor Bank

The operator can choose (via the Credit button) the difficulty for obtaining the Motor Bank. The choices are:

Ex. Easy	(Liberal) Down for the rest of the game once the three targets are hit.
Easy	Up at the start of every ball with target memory.
Medium	Up at the start of every ball with no target memory.
Hard	Up when locked and, at the start of every ball with target memory.
Ex. Hard	(Conservative) Up when locked and at the start of every ball with no target memory.

▲ 34 Spell Mouse Trap

The operator can choose (via the Credit button) the difficulty in obtaining M-O-U-S-E T-R-A-P. The choices are:

Easy	(Liberal) Both Return Lanes lit to spell MOUSE TRAP.
Medium	Both Return Lanes lit until MOUSE TRAP spelled 1st time. One Return Lane lit for every other time.
Hard	One Return Lane lit to spell MOUSE TRAP.
Ex. Hard	(Conservative) Return Lanes never lit.

▲ 35 Build Million

The operator can choose (via the Credit button) the difficulty setting for Build Million. The choices are:

Easy	(Liberal) Both Million Build arrows are lit at ball start.
Medium	On at game start with ball to ball memory.
Hard	OFF at the start of every ball.
Ex. Hard	(Conservative) Million Built arrow for ramp turns off when letter spotted.

▲ 36 Outlanes

The operator can choose (via the Credit button) the difficulty setting for the Outlanes. The choices are:

Easy	(Liberal) On at the start of every ball.
Medium	On at game start with ball to ball memory.
Hard	Off at game start with ball to ball memory.
Ex. Hard	(Conservative) Off at the start of every ball.

▲ 37 Outhole Bonus Memory

The operator can choose (via the Credit button) whether the Outhole Bonus is stored in memory for "next ball" play (continues from ball to ball) or, is reset for each ball. The choices are:

- Yes - (Liberal) The Outhole Bonus is remembered from ball to ball.
- No - (Conservative) The Outhole Bonus is cleared after countdown.

▲ 38 Extra Ball Lit Memory

The operator can choose (via the Credit button) whether the lighted Extra Ball lamps are stored in memory for "next ball" play (continues from ball to ball) or, is reset for each ball. The choices are:

- Yes - (Liberal) Lit Extra Ball lamps are remembered from ball to ball.
- No - (Conservative) Lamps are turned OFF at ball start.

▲ 39 Cheese Memory

The operator can choose (via the Credit button) whether the awarded Cheese Letters are stored in memory for "next ball" play (continues from ball to ball) or, are reset for each ball. The choices are:

- Yes - (Liberal) Lit C-H-E-E-S-E letters are remembered from ball to ball.
- No - (Conservative) C-H-E-E-S-E letters are turned OFF at ball start.

▲ 40 Double Playfield Timer

The operator can choose (via the Credit button) the amount of time the playfield scores will be doubled. The range of this setting is 30 seconds (Liberal) to, 0 seconds (Conservative, OFF).

▲ 41 Big Loop Timer

The operator can choose (via the Credit button) the amount of time it takes the Outer Loop shot to return to preset level after being built up. The range of this setting is 5 seconds (Liberal) to, 1 second (Conservative).

▲ 42 Jackpot Timer

The operator can choose (via the Credit button) the amount of time the Jackpot is awarded after Multi-ball™. The range of this setting is 30 seconds (Liberal) to, 1 second (Conservative) or 0 seconds (OFF).

▲ 43 Extra Balls Per Game

The operator can choose (via the Credit button) the MAXIMUM AMOUNT of ALL Extra Balls awarded by the Cheezy Bonus. The range of this adjustment setting is Enabled 1% (Conservative) through 99% (Extremely Liberal). This adjustment can also be Disabled, via a setting of 0 (OFF).

▲ 44 Specials Per Game

The operator can choose (via the Credit button) the MAXIMUM AMOUNT OF ALL Specials awarded during a single game. This adjustment controls how many Specials are awarded by the Cheezy Bonus. The range of this adjustment setting is Enabled 1% (Conservative) through 99% (Extremely Liberal). This adjustment can also be Disabled, via a setting of 0 (OFF).

▲ 45 Flash

The operator can choose (via the Credit button) the amount of Flashlamp use. The Choices are: Normal (fire Normal amount) to, Less (fire Less often).

▲ 46 Big Loop Begin Level

The operator can choose (via the Credit button) the difficulty in obtaining Big Loop Begin Level. The choices are:

Ex. Easy	Outer Loop shot value starts at 150K.
Easy	Outer loop shot value starts at 100K.
Medium	Outer loop shot value starts at 50K.
Hard	Outer loop shot needs two 50K shots before advancing.
Ex. Hard	Outer loop shot needs three 50K shots before advancing.

▲ 47 Ball Time

The operator can choose (via the Credit button) the desired ball time for a game. On the last ball, if a player has not reached this 'game time' period, a form of consolation play becomes effective to encourage players to continue playing. For MOUSIN' AROUND, the calculation involves determining at ball start for the last ball, whether at least 2/3 of the 'desired game time' has elapsed. If not, the Extra Ball lamp will turn on to allow the player a chance to obtain an Extra Ball. The range of this setting is OFF (Extra Ball is not lit, because there is no minimum game time limit), 1 second (Conservative) through 99 seconds (Liberal).

NOTE: Consolation Extra Balls are NOT audited as Extra Balls.

▲ 48 Attract Mode Sounds

The operator can select (via the Credit button) whether there will be sounds occurring during the Attract Mode. The choices are:

- Yes - There will be sound during the attract mode.
- No - There will not be sound during the attract mode.

▲ 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. The message provided is: BE THE NEXT BIG CHEESE-PLAY...MOUSIN' AROUND
- 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 Display AU 01 - 04

The operator can choose (via the Credit button) how to display the coinage audit information, Au 01 - 04. No information is lost; it remains stored in the CPU memory. The information is now available for readout via the player score displays. Three choices are available:

- Yes - Both the audit text (slot identification) and the value is displayed.
- Value - Only the value is displayed.
- No - NO display occurs.

▲ 51-52 Not Used

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) either modify a game for a specific area (for example, USA coinage settings, Ad 56 through 58, or special German coinage settings, 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.

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. Operator installation of the 'selected' Preset Adjustment occurs by using the Credit button to choose YES and then pressing the ADVANCE switch. The displays then show the name of the Adjustment again, with DONE to show that the installation is now in effect.

Note that, when an operator installs any of the Special Preset Adjustments, Adjustment Items using the automatic adjust feature of the game program reset to the auto adjust value listed for that Adjustment Item.

NOTE

Games in which the CPU has ROMs installed for German (Deutsch) language and play adjustments automatically have certain Adjustment Items preset. The following table shows these Preset Adjustment Items for each of the special German Coinage Adjustments.

▲ 53 Through 58 FOR GERMAN/EUROPEAN GAMES ONLY:

Install German 1, 2, 3, 4, 5 or 6

The operator can use these Adjustment Items to modify the game pricing selection of Standard Setting named "German 2 or German 1" in the Pricing Table to permit the style of play for the particular price shown in the *MOUSIN' AROUND* Preset Game Adjustments Table for German/European Games.

Preset Game Adjustments Table For **GERMAN/EUROPEAN GAMES**

AD	ADJ DESCRIPTION	GERMAN 1 AD 53	GERMAN 2 AD 54	GERMAN 3 AD 55	GERMAN 4 AD 56	GERMAN 5 AD 57	GERMAN 6 AD 58
06	Replay Award	Credit	Coil	Audit	Credit	Coil	Audit
07	Special Award	Credit	Ball	Score	Credit	Ball	Score
08	Match Feature	10%	10%	Off	10%	10%	Off
09	Balls/Game	03	03	03	03	03	03
14	Backup High Score 1	8,500,000	8,500,000	00	8,500,000	8,500,000	00
15	Backup High Score 2	8,000,000	8,000,000	00	8,000,000	8,000,000	00
16	Backup High Score 3	7,500,000	7,500,000	00	7,500,000	7,500,000	00
17	Backup High Score 4	7,000,000	7,000,000	00	7,000,000	7,000,000	00
18	High Score 1 Credits	03	03	00	03	03	00
19	High Score 2 Credits	00	00	00	00	00	00
20	High Score 3 Credits	00	00	00	00	00	00
21	High Score 4 Credits	00	00	00	00	00	00
24	Coinage Setting	6 spiele/5 DM	6 spiele/5 DM	6 spiele/5 DM	7 spiele/5 DM	7 spiele/5 DM	7 spiele/5 DM

▲ 53 Advertisement For USA and Canadian Games Only

The operator can choose (via the Credit button) whether to display an advertisement provided by the manufacturer.
The choices are:

- Yes - Display the advertisement message.
- No - Do NOT display the message.

▲ 54 Through 58 For USA and Canadian Games Only

The operator can use these Adjustment Items to modify the game pricing selection and select either the 3-ball or, 5-ball style of play.

Preset Game Adjustments Table For **US/CANADIAN GAMES**

AD	ADJ DESCRIPTION	AD 54 1 Coin Buy-in	AD 55 Install 3-ball	AD 56 3-ball/ 2 Coins	AD 57 3-balls/ 1 Coin	AD 58 5-balls/ 2 Coins
02	Replay Start	-	6,000,000	6,000,000	6,000,000	7,000,000
09	Balls/Game	-	3	3	3	5
14	Backup High Score 1	-	8,000,000	8,000,000	8,000,000	9,000,000
15	Backup High Score 2	-	7,500,000	7,500,000	7,500,000	8,500,000
16	Backup High Score 3	-	7,000,000	7,000,000	7,000,000	8,000,000
17	Backup High Score 4	-	6,500,000	6,500,000	6,500,000	7,500,000
24	Coinage	USA	-	USA 2	USA 1	USA 2
31	Half Price Buy-in	Yes	No	No	No	No
64	Install Medium	No	Yes	Yes	Yes	No
65	Install Hard	No	No	No	No	Yes

▲ 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	18	Hi Scr 1 Credits	00
07	Special Award	Ball	19	Hi Scr 2 Credits	00
08	Match Feature	Off	20	Hi Scr 3 Credits	00
11	Ex. Ball	4/BIP	21	Hi Scr 4 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 difficulty level. NOTE Ad 65 (Install Hard) settings are also set when the game is changed to '5-ball play'. 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	7,000,000	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	07	Special Award	Score
02	Replay Level 1	Off	08	Match Feature	Off
03	Replay Level 2	Off	11	No Extra Ball	00
04	Replay Level 3	Off	18	Hi Scr 1 Credits	00
05	Replay Level 4	Off	19	Hi Scr 2 Credits	00
06	Replay Award	Audit	20	Hi Scr 3 Credits	00
			21	Hi Scr 4 Credits	00

▲ 62 Install Extra Easy

The operator can change the game play difficulty adjustments to a combination that is extremely easy (sometimes called "liberal"). The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Extra Easy' group.

▲ 63 Install Easy

The operator can change the game play difficulty adjustments to a combination that is slightly easier than the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Easy' group.

▲ 64 Install Medium

The operator can change the game play difficulty adjustments to a combination that matches the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Medium' group.

▲ 65 Install Hard

The operator can change the game play difficulty adjustments to a combination that is more difficult than the Factory Settings. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Hard' group.

▲ 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. The Game Adjustment Setting Comparison Table, which precedes these 70 individual Adjustments descriptions, lists the Adjustments and the settings that comprise the 'Extra Hard' group.

▲ 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 DONE to show that the coinage audits have been reset to zero.

▲ 69 Clear Audits

The operator can request the clearing of the non-coinage audits (Au 05 through 55) 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 DONE to show that the non-coinage audits have been reset to zero.

▲ 70 Install Factory

The operator can request the game (via the Credit button) to provide the normal Factory Settings, essentially restoring the game to its 'factory condition'. The operator must select the 'YES' option for this adjustment. This Adjustment clears all Audits, resets all Game Adjustments to the respective Factory Settings, and provides a restart of the Auto Replay (Ad 01). After selecting the YES option, 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.

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 *MOUSIN' AROUND*, 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 setting 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, with a number for a country having more than one "Standard" Setting; player 3 and 4 displays show the games per coin(s) information). In the Pricing Table, each "Standard" Setting is denoted by a Country Identifier. 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. In the table where the word "CUSTOM" appears, the owner/operator must enter the values shown (columns 25 through 30) to obtain the games per coin factor shown in the Games/Coin column of the table. To make these setting adjustments, the owner/operator must press the Credit button until the words "CUSTOM COINAGE" appear in the player score displays.

MOUSIN' AROUND Pricing Table

Country	Coin Chute			Games/Coin	Ad 24 Display	Pricing Functions					
	Left	Center	Right			25	26	27	28	29	30
USA and Canada	25¢	-	25¢	1/25¢, 4/\$1 ²	U.S.A. 1	01	04	01	01	00	00
				1/50¢, 2/75¢, 3/\$1 ^{1,2}	U.S.A. 2	03	12	03	04	00	00
				1/50¢, 2/\$1 ²	U.S.A. 3	01	04	01	02	00	01
				1/50¢, 3/\$1	U.S.A. 4	01	00	01	02	04	01
				1/50¢ ; Add'l game: 25¢	CUSTOM	98	00	98	99	00	00
Austria	5 Sch	10 Sch	10 Sch	1/2x5 Sch, 3/2x10 Sch ²	AUSTRIA	01	02	02	02	04	01
	5 Sch	-	10 Sch	2/5 Sch, 5/10 Schilling	CUSTOM	02	00	05	01	00	00
	1 Sch	5 Sch	10 Sch	2/5x1 Sch, 2/5 Sch, 5/10 Sch	CUSTOM	02	10	25	05	00	00
Australia	20¢	-	\$1	1/3x20¢, 2/\$1 ²	AUSTRAL.	02	00	10	05	00	00
United Kingdom	10 P	50 P	1£	1/3x10 P, 2/50 P, 5/1£ ²	U.K.	02	10	20	05	20	00
Switzerland	1 F	2 F	5 F	1/1 F, 3/2 F, 7/5 Franc ²	SWISS	01	03	07	01	00	00
	1 F	-	2 F	1/1 F, 3/2 F	CUSTOM	03	00	06	02	00	00
Belgium	20F	-	50 F	1/20 F, 3/50 Franc ²	BELGIUM	06	00	15	05	00	00

MOUSIN' AROUND Pricing Table (Continued)

Country	Coin Chute			Games/Coin	Ad 24 Display	Pricing Functions					
	Left	Center	Right			25	26	27	28	29	30
West Germany	1 DM	2 DM	5 DM	1/1 DM, 2/2 DM, 7/5 DMark ^{2,3}	GERMAN1	06	12	30	05	30	00
				1/1 DM, 2/2 DM, 6/5 DM ^{1,2}	GERMAN2	06	12	30	05	00	00
				1/1 DM, 3/2 DM, 9/5 DM	CUSTOM	09	18	45	05	00	00
				1/2x1 DM, 1/2 DM, 3/5 DM	CUSTOM	03	06	15	05	00	00
				2/1 DM, 5/2 DM, 14/5 DM	CUSTOM	13	26	65	05	65	00
Netherlands	1 Hfl	2.5 Hfl	2.5 Hfl	1/1 Hfl, 3/2.5 Holland Florin ²	NETHERL.	06	15	15	05	00	00
	25¢	-	1 G	1/25¢, 5/1 Guilder	CUSTOM	01	00	05	01	00	00
	1G	-	1 G	1/1 Guilder ²	HOLLAND	01	00	01	01	00	00
Sweden	5 Kr	5 Kr	5 Kr	1/5 Krona ²	SWEDEN	01	01	01	01	00	00
	1 Kr	-	1 Kr	1/2x1 Krona	CUSTOM	01	04	01	02	00	01
France	1F	5F	10F	1/3x1F, 3/5F, 7/10 Franc ^{1,2}	FRANCE	03	15	30	05	30	00
	1F	5F	10F	1/3x1 F, 2/5 F, 5/10 Franc	CUSTOM	02	10	20	05	20	00
	5F	10F	10F	1/5 F, 3/10 F, 7/2x10 Franc	CUSTOM	03	15	30	10	60	15
	5F	10F	10F	2/5 F, 4/10 F, 9/2x10 Franc	CUSTOM	02	10	20	05	40	10
	5F	10F	10F	2/5 F, 5/10 F, 11/2x10 Franc	CUSTOM	01	05	10	02	20	05
Italy	200 L	-	500 L	1/2X200 L, 3/2X500 L Lire ²	ITALY	06	00	15	10	00	00
Spain	25 P	-	100P	1/25 P, 5/100 Peseta ²	SPAIN	05	00	20	04	00	00
	25 P	-	100P	1/25 P, 4/100 Peseta	CUSTOM	01	00	04	01	00	00
	25 P	-	100P	1/2x25 P, 2/100 Peseta	CUSTOM	01	00	04	02	00	00
	25 P	-	100P	1/2x25 P, 3/100 Peseta	CUSTOM	03	00	12	04	00	06
Japan	100 ¥	-	100 ¥	1/100 Yen ²	JAPAN	01	00	01	01	00	00
Antilles, Netherl.	25¢	-	1 G	1/25¢, 4/1 Guilder ²	ANTILLES	01	01	04	01	00	00
Chile	Token	-	Token	1/1 Token ²	CHILE	01	04	01	01	00	00
Denmark	1 Kr	5 Kr	10 Kr	1/2x1 Kr, 3/5 Kr, 7/10 Krone ²	DENMARK	03	15	30	05	30	00
Finland	1 Mka	-	5 Mka	1/2x1 Mka, 3/5 Markka ²	FINLAND	03	00	15	05	00	00
New Zealand	20¢	-	20¢	1/3x20¢ ²	N. Z.	01	00	01	03	00	01
Norway	1 Kr	-	1 Kr	1/2x1 Kr, 3/5x1 Krone ²	NORWAY	01	00	01	02	05	00
Argentina	10¢	10¢	10¢	1/1 Token ²	ARG.	01	01	01	01	00	00
Greece	10D	20D	50D	1/2x10D, 1/20D, 3/50Drachma ²	GREECE	03	06	15	05	00	00

Notes: 1. Factory Default. 2. Standard Setting - Change by pressing Credit button. 3. Other functions are also affected; see the explanations for Adjustment Items 53 through 58.

___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.)

___MINIMUM COIN UNITS

Item 30 determines the number of coin units that must pass through the coin chute(s) before play may begin. The Factory Setting for this item is 00. (This 00 means that the Minimum Coin Units feature (Item 30) is disabled; a 01 setting also means that this feature is still disabled, yet the Credits message display should display fractional coin units.)

Test/Diagnostic Procedures

MOUSIN' AROUND 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 motor bank, 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

The System-11B game program greatly aids the operator and service personnel: At the beginning of the Test/Diagnostic Procedures (and also at game Turn-On), the player score displays now signal, with a message ("Press ADVANCE for Report") that at least one switch has NOT been actuated during ball play for a lengthy period of time (90 balls, or 30 games). Moreover, the Problem Reporting activity at the beginning of the Test/ Diagnostic Procedures, the display of problem switches 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 - 'Main Theme' through 07 - 'Hi. Score Theme' (the selections repeat). Adjust the volume control for proper sound level for the game location.
2. Use the AUTO-UP position to proceed to the next test.

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.

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 Lamps Test 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.

MOUSIN' AROUND Lamp Matrix

column	1 Q66	2 Q64	3 Q62	4 Q60	5 Q58	6 Q56	7 Q54	8 Q52
row	YEL-BRN 1J7-1	YEL-RED 1J7-2	YEL-ORN 1J7-3	YEL-BLK 1J7-4	YEL-GRN 1J7-6	YEL-BLU 1J7-7	YEL-VIO 1J7-8	YEL-GRY 1J7-9
1 Q80 RED-BRN 1J6-1	Shoot Again 1	C 9	M 17	T 25	Set Trap 1 33	Qualify Million 1 41	N 49	Jackpot 1 Million 57
2 Q81 RED-BLK 1J6-2	Set Trap 2 2	H 10	O 18	R 26	Playfield Multiply 34	Extra Ball 1 42	O 50	Jackpot 1.5 Million 58
3 Q82 RED-ORN 1J6-3	50 K 3	E 11	U 19	A 27	Spot Cheese 3 35	Spot Cheese 1 43	I 51	Jackpot 2 Million 59
4 Q83 RED-YEL 1J6-5	100 K 4	E 12	S 20	P 28	Kickback 36	Qualify Million 2 44	L 52	Jackpot 2.5 Million 60
5 Q84 RED-GRN 1J6-6	150 K 5	S 13	E 21	Left Center Target 29	Left Outlane 37	Extra Ball 2 45	L 53	Jackpot 3 Million 61
6 Q85 RED-BLU 1J6-7	200 K 6	E 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Spot Cheese 2 46	I 54	Jackpot 4 Million 62
7 Q86 RED-VIO 1J6-8	250 K 7	2X Bonus 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Right Stand-up Target 47	M 55	Jackpot 5 Million 63
8 Q87 RED-GRY 1J6-9	Jackpot 8	3X Bonus 16	Top Lanes Right 24	Double Play Value Timer 32	Right Outlane 40	Cheezy Bonus * * 48	Bulld Jackpot 56	Not Used 64

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 "BONUS 1K", the name of the lamp currently blinking. 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. (To proceed through a descending series of lamp identifiers, use MANUAL-DOWN.) Press and hold the Credit button to proceed rapidly to the desired lamp.

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 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.

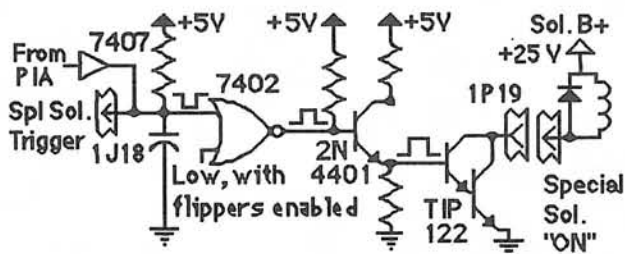
To continuously pulse a single solenoid/circuit, use MANUAL-DOWN. Press ADVANCE to sequence through the switched, controlled, and special solenoids. Use AUTO-UP to resume test cycling, and to proceed to the next test.

MOUSIN' AROUND Solenoid Table

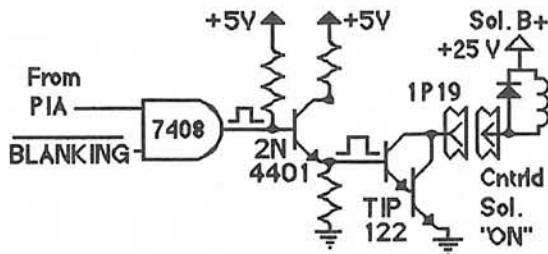
Sol. No.	Function	Solenoid Type	Wire Color	Connections		Driver Trnstr	Solenoid Part Number	
				CPU Bd	Playfield/Cabinet		Flashlamp Type	
							d= Display Bd; p=Playfield	
01A ³	Outhole Kicker	Switched	Vio-Brn	1P11-1	5J1-9: 5J4-9 (A)	Q33	AE-23-800	
01C ³	Right Flipper Flasher	Switched	Blk-Brn	(Gry-Brn)	5J5-9 (C)	Q33	#89 flashlamps	2p
02A ³	Ball Shooter Lane Feeder	Switched	Vio-Red	1P11-3	5J1-7: 5J4-8 (A)	Q25	AE-23-800	
02C ³	Left Flipper Flasher	Switched	Blk-Red	Gry-Red	5J5-8 (C)	Q25	#89 flashlamps	2p
03A ³	Trap 1 Up	Switched	Vio-Orn	1P11-4	5J1-6: 5J4-7 (A)	Q32	AE-26-1400	
03C ³	Left Side Flasher	Switched	Blk-Orn	Gry-Orn	5J5-7(C)	Q32	#89 flashlamps	1p
04A ³	Trap 2 Up	Switched	Vio-Yel	1P11-5	5J1-5: 5J4-6 (A)	Q24	AE-26-1400	
04C ³	Back Panel Flasher	Switched	Blk-Yel	Gry-Yel	5J5-5 (C)	Q24	#906 flashlamp	1b
05A ³	Trap 1 Down	Switched	Vio-Grn	1P11-6	5J1-4: 5J4-5 (A)	Q31	SM1-28-800	
05C ³	Top Right Flasher	Switched	Blk-Grn	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamp	1p
06A ³	Not Used	Switched	Vio-Blu	1P11-7	5J1-3: 5J4-4 (A)	Q23		
06C ³	Right Ramp Flasher	Switched	Blk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#89 flashlamp	1p
07A ³	Knocker	Switched	Vio-Blk	1P11-8	5J1-2: 5J4-2 (A)	Q30	AE-23-800	
07C ³	Left Ramp Flashers	Switched	Blk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#89 flashlamp	1p
08A ³	Trap 2 Down	Switched	Vio-Gry	1P11-9	5J1-1: 5J4-1 (A)	Q22	SM1-28-800	
08C ³	Timer Flasher	Switched	Blk-Gry	(Gry-Blk)	5J5-1 (C)	Q22	#89 flashlamps	2p
09	Insert Board Gnl Illum Relay	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9: 2J4-3	Q17	5580-09555-01	4a
10	Playfield Gnl Illum Relay	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-09555-01	4a
11	Motor Relay	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	5580-12145-01	4b
12	A/C Select	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01	5
13	Kickback (L. Outlane)	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	AE-24-900	
14	Ball Diverter	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800	
15	Center Flashers	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	#89 flashlamps	1p
16	Mouse Hole Exit	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-26-1200	
17	Left Jet Bumper	Special #1	Blu-Brn	1P19-7	5J3-7: 5J7-7	Q75	AE-23-800	
18	Left Kicker ("sling")	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500	
19	Right Jet Bumper	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800	
20	Right Kicker ("sling")	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500	
21	Lower Jet Bumper	Special #5	Blu-Grn	1P19-8	5J3-2: 5J7-2	Q77	AE-23-800	
22	Top Lanes Gate	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	SM2-35-4000	
-	<u>Right Flipper</u>	-	Orn-Vio	1P19-1	2J5-5: 2J10-7	-		
-	Lower Right Flipper	-	[Blu-Vio] ²		[2J10-1: 2J8-15]		FL11630/50VDC	
-	<u>Left Flipper</u>	-	Orn-Gry	1P19-2	2J5-4: 2J10-8	-		
-	Lower Left Flipper	-	[Blu-Gry] ²		[2J10-2: 2J8-4]		FL11630/50VDC	

Notes 1. Wire colors, except flipper Orn-Vio and Orn-Gry are ground connections (to 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" circuits are pulsed, when Sol. 12 is de-energized; "C" circuits are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the J1-terminal connection listed for the Aux Power Driver Bd. which controls the device pulsing by Sol. 12. 4. Relay is mounted on Relay bd. (4a) C-11998-1; (4b) C-11902-1. 5. Relay mounted on Aux. Power Driver Bd., D-12247.

"On" State Logic - Special Solenoid



"On" State Logic - Controlled



"Off" State - Special Solenoid:

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

"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 Flasher circuit (sol. 01C), which has two lamp circuits, one to the Insert Board and one to the playfield. Using this "multiplexing" technique, the same driver transistor can control actuation of two separate solenoid circuits.

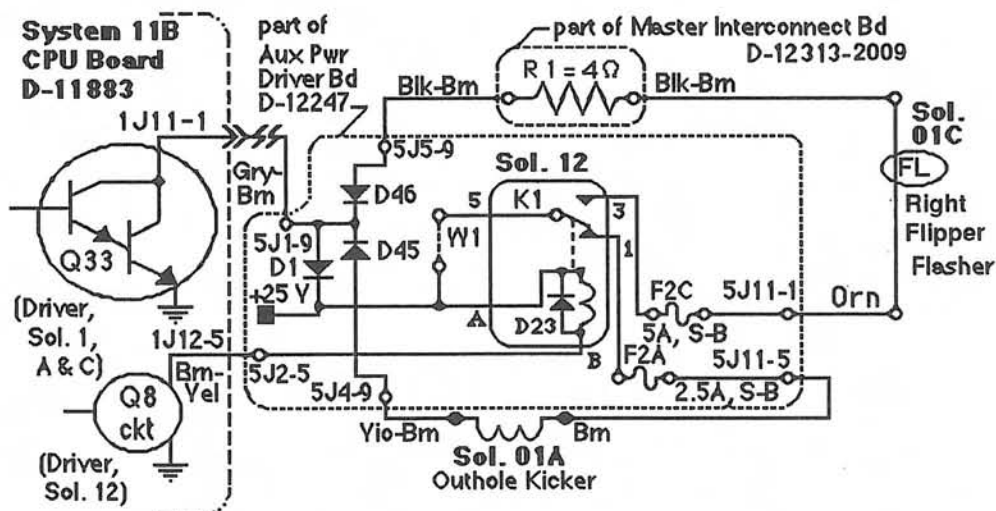


Figure 4. Typical Solenoid A/C Select Relay Circuit, showing the function of Solenoid 12, the Solenoid A/C Select Relay

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 *MOUSIN' AROUND* System-11B'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 *MOUSIN' AROUND*, switch numbers can range from 01 through 64. 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.

MOUSIN' AROUND Switch Matrix

column	1 Q45	2 Q49	3 Q44	4 Q48	5 Q43	6 Q47	7 Q42	8 Q46
row	GRN-BRN 1J8-1	GRN-RED 1J8-2	GRN-ORN 1J8-3	GRN-YEL 1J8-4	GRN-BLK 1J8-5	GRN-BLU 1J8-7	GRN-VIO 1J8-8	GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Outhole 9	M 17	T 25	Trap 1 Up/Down 33	Trap 1 Ball 41	Ball Diverter 49	Right Flipper 57
2 WHT-RED 1J10-8	Not Used 2	Not Used 10	O 18	R 26	Trap 2 Up/Down 34	Trap 2 Ball 42	Motor Bank Down 50	Left Flipper 58
3 WHT-ORN 1J10-7	Credit Button 3	Trough 1 Right 11	U 19	A 27	Center Ramp 35	Motor Bank Up 43	Left Outlane 51	Mouse Hole Lock 1 59
4 WHT-YEL 1J10-6	Right Coin Chute 4	Trough 2 Middle 12	S 20	P 28	Playfield Multiply 36	Right Ramp Enter 44	Left Jet 52	Mouse Hole Lock 2 60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Trough 3 Left 13	E 21	Left Center Target 29	Left Ramp Exit 37	Not Used 45	Right Jet 53	Mouse Hole Lock 3 61
6 WHT-BLU 1J10-3	Left Coin Chute 6	Shooter Lane 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Right Ramp Exit 46	Bottom Jet 54	Not Used 62
7 WHT-VIO 1J10-2	Slam Tilt 7	Right Return Loop 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Left Ramp Enter 47	Left Sling 55	Not Used 63
8 WHT-GRY 1J10-1	High Score Rset 8	Left Return Loop 16	Top Lanes Right 24	Mouse Hole Enter 32	Right Outlane 40	Not Used 48	Right Sling 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 to ground.
- ▼ **Multiple Switch Number Indications.** Check for a bad diode on any of the switches.
- ▼ **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 to ground or, a bad transistor (Q42-Q49) on the CPU Board.

Use AUTO-UP to proceed to the next test.

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-11B switch testing program. When actuating 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 *MOUSIN' AROUND* 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 are 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 during game play, 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) produce an indication of switch 09 being actuated. If only one number is produced for every simulated switch actuation that occurred then the CPU is good and the problem is elsewhere.

C-SIDE TEST

From the Switch Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, C-SIDE TEST, and that the Player 3 displays shows 09 (C-Side Test identifier). This test confirms that the Solenoid A/C Select Relay (Sol. 12) is actually in the 'C' position (ready to power flashlamp circuits).

The Player 1 and 2 displays then change to show the 'side' of the circuit being tested, alternating the A/C Relay between "SELECTED A-SIDE" and "SELECTED C-SIDE", while the Player 4 display shows the state of the C-Side Switch. When the switch is closed, the Player 4 display shows "C-SIDE".

The message "Err" appears whenever the C-Side Switch is not operating properly. Causes of improper operation can be blown fuses (F8 or F2C) or a faulty relay on the Aux Power Driver Board; failure of the 12 or 24 volt power circuits; a switch matrix failure; or faulty connections between the circuit boards in the game's backbox (CPU Board, Aux Power Driver Board, Backbox Interconnect Board). To halt the A/C Relay's operation, press MANUAL-DOWN and press ADVANCE to activate the A/C Relay manually.

MOTOR TEST

In the Motor Test, the words "Motor Bank Test" appear in the player 1 & 2 score display, the Motor Bank Targets rise. After a pause, the word "UP or Down" appear in the score display, and the Motor Bank Targets lower. If, during this test the word "ERROR" appears in the score display, there is a problem with one of the switches, located on the motor, that tells the CPU the position of the motor. Switch 43 tells the CPU that the Motor Bank is up therefore; if "UP ERROR" appears, switch 43 is not working. Switch 50 tells the CPU that the Motor Bank is down therefore; if "DOWN ERROR" appears, switch 50 is not working.

ENDING THE DIAGNOSTIC TESTS

To end the Diagnostic Tests, reach the C-Side Test (09 in the Player 3 display), use AUTO-UP and press ADVANCE. The backbox displays should MANUAL-DOWN, and press ADVANCE to reach Adjustment Item 70 (INSTALL FACTORY). Use AUTO-UP, and press ADVANCE to go to 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, the Solenoid Test and, the Motor Test.
3. To halt the Auto Burn-in Mode, switch the game Off and then On. *MOUSIN' AROUND* 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.)

CPU LED Indicator Codes Table

Blinks/ Flashes	CPU Problem	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-11B MEMORY CHIP TEST

A new feature is now included in the Memory Chip Test for System 11B. 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 to begin.

In addition to the displayed message, when a test fails, LED 2 ('DIAGNOSTIC') mounted on the CPU Board can be observed to determine the probable cause of the problem. This 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 reset the program by pressing the CPU Switch (SW 2) on the edge of the CPU Board.

SYSTEM-11B SOUND CIRCUITRY TESTS

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

1. **Audio Board Test.** A brief check of the Audio Board (D-11581) circuitry occurs at game Turn-on; the game reports the test results by brief sounds, as follows: No sound = Audio 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-11B Sound Test.** Press the Sound Diagnostic Switch (SW 1) on left edge of the CPU Board. Listen for the two test sounds, showing that both the CVSD (Continuously Variable Slope Delta) Modulator, which provides the voices for *MOUSIN' AROUND*, and the DAC (Digital-to-Analog Converter) sound circuits are functioning properly.

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 iron 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 or a 'click' 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 sound 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.

Problem Analysis Messages

The SYSTEM 11B game program has a great capability to aid the operator and service personnel: At game Turn-on (and also at the beginning of Test/Diagnostic Procedures) after the game has been operating for an extended period, the player score displays now may signal with a message, "Press ADVANCE for Report", that the game program has detected a possible problem with the game.

To obtain details of the problem, open the coin door and press the AUTO-UP/MAUNAL-DOWN switch to MANUAL-DOWN. Press the ADVANCE button to begin displaying the message(s). The following messages apply to your *MOUSIN' AROUND* game.

Malfunction Chech Switch ## (name). This message indicates that at least one switch has not been actuated during ball play (for 90 balls or apx. 30 games) by displaying the message "Check Switch ## (name)", listing each problem switch by number and name. (The game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep *MOUSIN' AROUND* earning good profits).

To verify the problem, refer to the Test/Diagnostic Procedures text describing Switch Testing, and check each reported switch using applicable Switch Levels and Switch Edges tests. Always check switch operation using a ball to simulate game conditions. (Switch problems may often be resolved by adjusting the wire switch actuators, fixing electric problems, securing loose connectors, etc).

Malfunction Pinball Missing. *MOUSIN' AROUND* normally uses three balls. This message annouces that one is missing or stuck somewhere. When the ball is located , return it to the playfield via the Outhole. Other possibilities for this problem could be malfunctions of the Ball Trough Switches (#11, #12 and #13) or, the Ball Shooter Switch (#14).

Music Error. This message means that no signals are coming from the Audio Board. Check the Audio Board for presence of *MOUSIN' AROUND* ROMs. Also, check that the cable connecting the Audio and CPU Boards is firmly seated, and that the red line on the cable is going to the same pin on both boards. Turn the game Off, then On, to be sure only 1 'Bing' sounds. More then one 'Bing' or, no 'Bing' indicates an Audio Board problem. Refer to text about System 11B Sound Circuitry tests for more information.

Other **PROBLEM ANALYSIS MESSAGES** are self-explanatory.

- **Malfunction Check Motor Up**
- **Malfunction Check Motor Down**
- **Malfunction Check Diverter**
- **Malfunction Check Right Trap**
- **Malfunction Check Left Trap**

Maintenance Information

• Ball Shooter Lane Feeder

Figure 5 shows the two main lubrication points of the Ball Shooter Lane Feeder. 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. Note that there are mechanisms quite similar to this Assembly; they have the same lubrication requirements and adjustment capabilities as the Ball Shooter Lane Feeder.

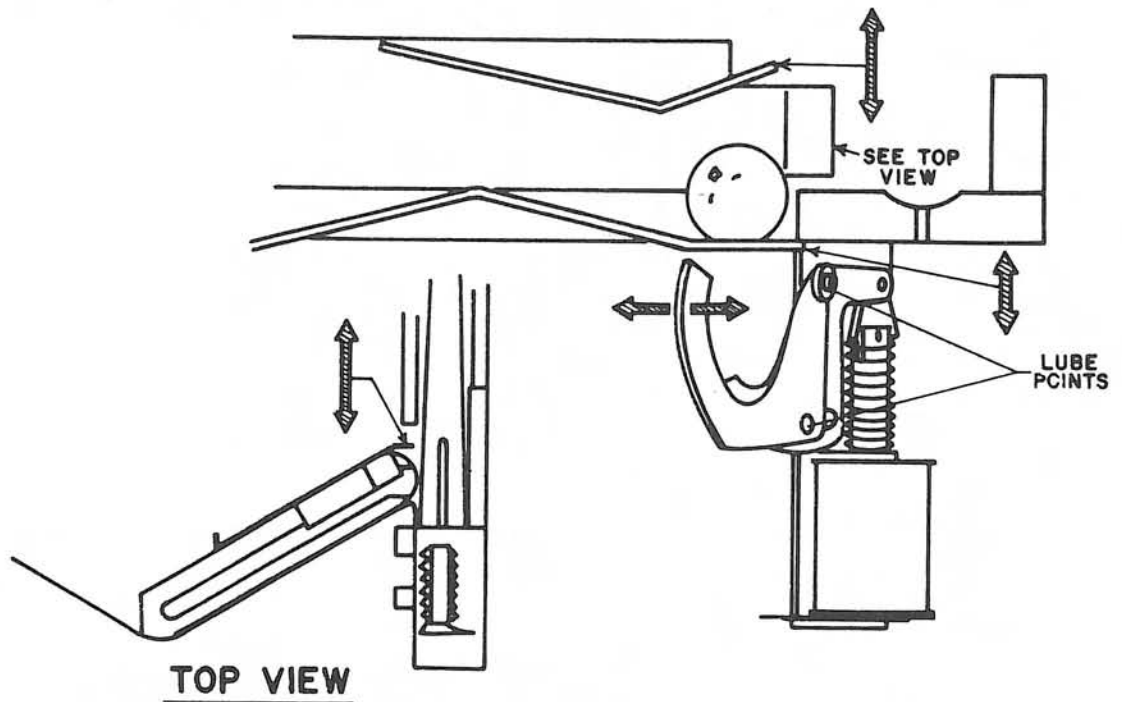


Figure 5. Adjustments and Lubrication Points, Shooter Lane Feeder

• Left & Right Kickers

Because of the functional design (arm-actuated via solenoid plunger operation), the pivot points of the Left and Right Kickers ("Slingshots") all require lubrication as a regular servicing procedure. Mechanical adjustments are simple and somewhat similar to the Ball Shooter Lane Feeder. These mechanisms should also be checked for proper fit (snugly tight) where they attach to the playfield.

• Drop Target

Clean the drop target assembly often to ensure proper operation. Lubricate with MBI Instrument Grease (p/n 20-8886). Apply a thin coat of lubricant in the groove located at the back of the plastic target assembly.

• Playfield

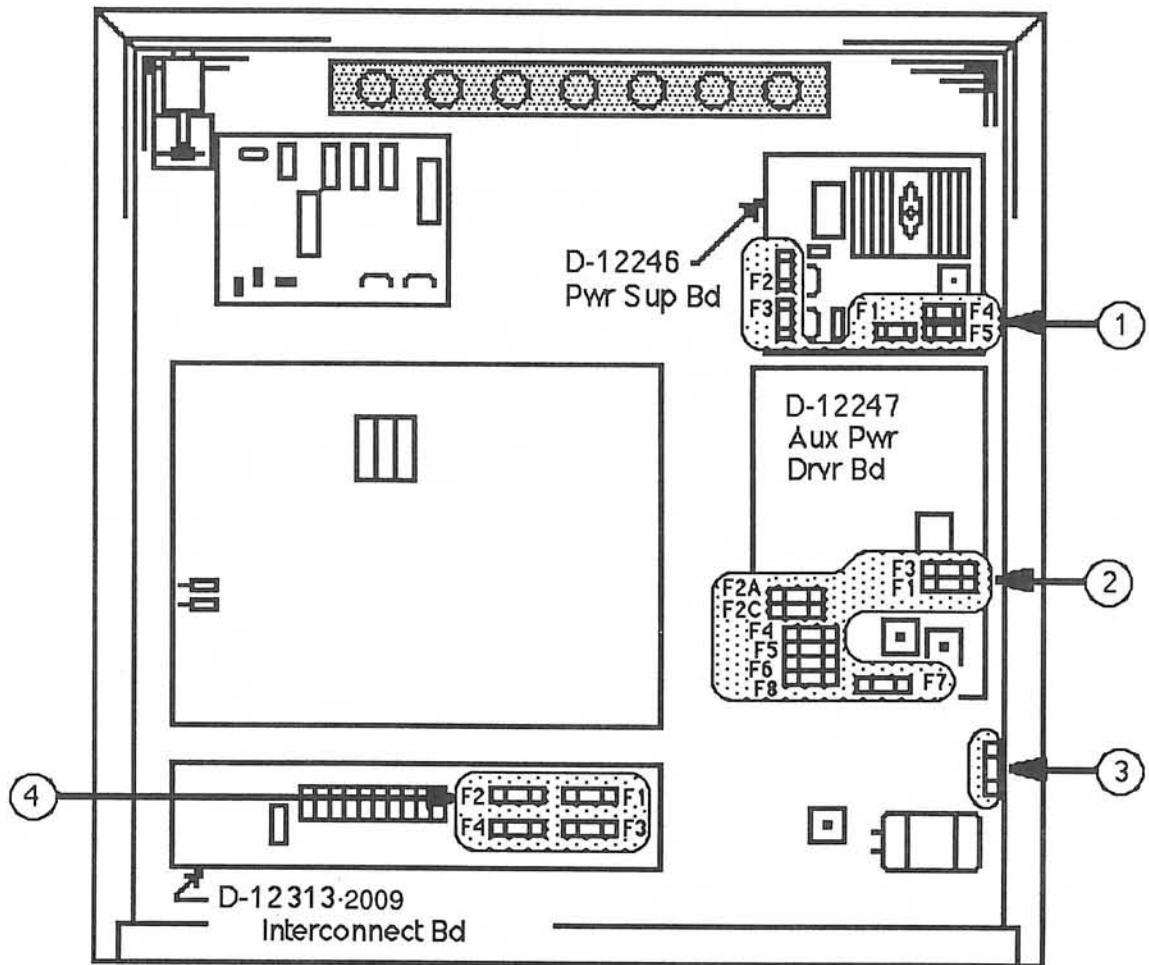
Playfield life expectancy and play can be extended by periodic cleaning. Inspect and hand polish the balls in a clean cloth. Replace chipped balls; otherwise, these balls will ruin the playfield finish in a short time. Don't use quantities of water, caustic or abrasive cleaners or cleaning pads on the playfield. Don't allow polish or wax to build-up, (waxes yellow with age and spoil the appearance of the playfield).

• Switches

Switch contacts should be free of dust, dirt, and corrosion. Filing or burnishing most switch contacts breaks the finish and encourages corrosion. Effective contact cleaning requires gentler treatment. Gently close the contacts on a clean business card or piece of paper. Wipe the contacts until they're clean. If necessary, regap the contacts to 1/16 inch.

Flipper End-of-Stroke switch contacts must be treated differently from other switch blade contacts; they provide heavier current carrying capability than other pinball game switch contacts. Severely pitted contacts cause flippers to be weak. Smooth the pitted contact surface of the E.O.S. switch contacts with a contact file. Then, polish your work with a burnishing tool. regap the contacts if necessary, to 1/16 inch.

Fuse Locations Diagram & Listing



Fuse Listing

ITEM	PART NUMBER	DESCRIPTION	CIRCUIT/LOCATION
1	5731-12328-00	Fuse, 3/8A., S-B, 250V	F1; D-12246 Power Supply Board
1	5731-12327-00	Fuse, 1/8A., S-B, 250V	F2, F3; D-12246 Power Supply Board
1	5731-09432-00	Fuse, 7A S-B, 250v	F4, F5; D-12246 Power Supply Board
2	5731-09128-00	Fuse, 2-1/2A., S-B, 250v	F1, F2A, F3, F4; D-12247 Aux Pwr Driver Board
2	5731-09651-00	Fuse, 5A., S-B, 250v	F2C; D-12247 Aux Pwr Driver Board
2	5731-08665-00	Fuse, 2A., S-B, 250v	F5, F6; D-12247 Aux Pwr Driver Board
2	5731-06314-00	Fuse, 4A., S-B, 250v	F7; D-12247 Aux Pwr Driver Board
2	5731-09432-00	Fuse, 7A., S-B, 250v	F8; D-12247 Aux Pwr Driver Board
3	5730-09071-00	Fuse, 8A., S-B, 32v	+18 Vdc Lamp Ckt/ Lwr Rt B/box fuseholder (1)
4	5731-09651-00	Fuse, 5A., S-B, 250v	F1 - F4; Gen. Illum./B'box Interconnect Board
-	5730-09252-00	Fuse, 8A, Slow-Blow(S-B), 125v	Input ("high voltage") Power Line/Cabinet Box*

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

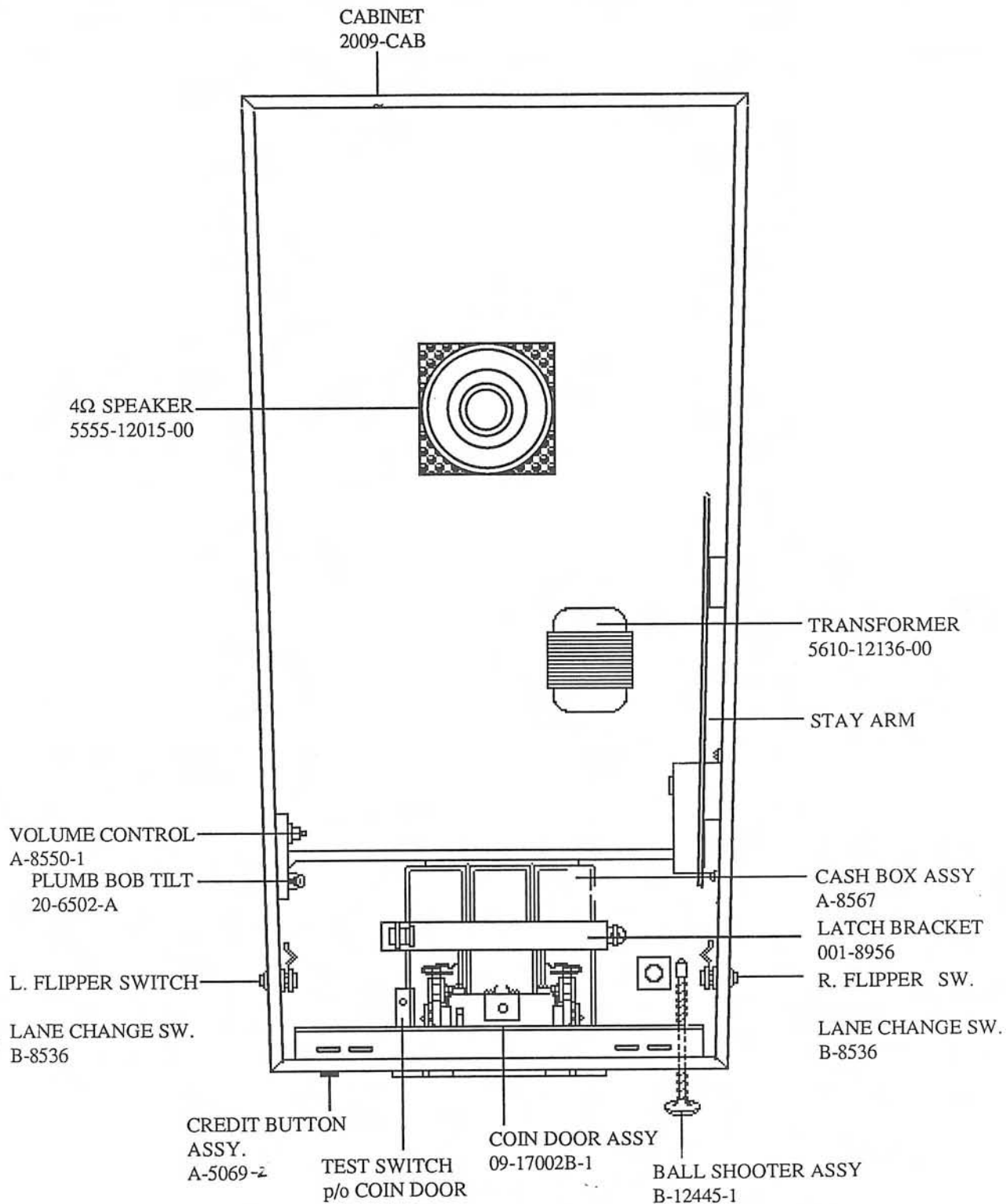
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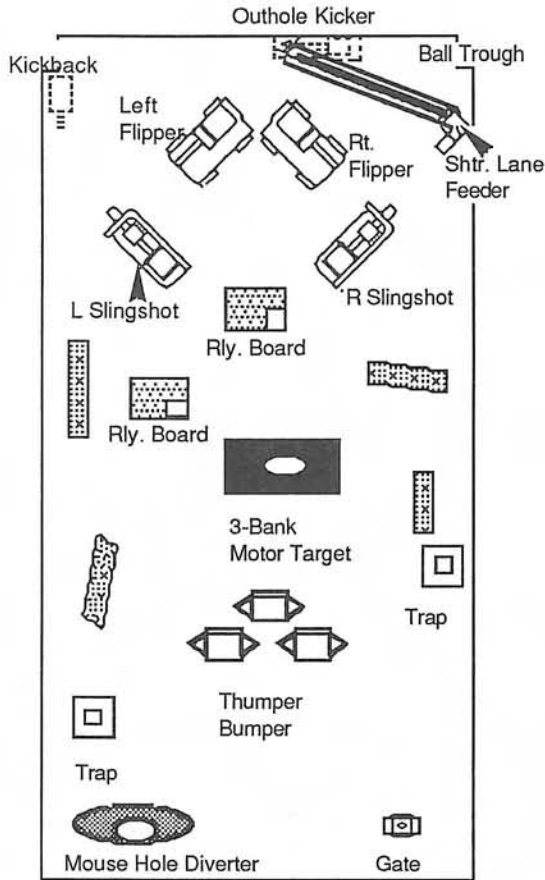
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Game Parts Information

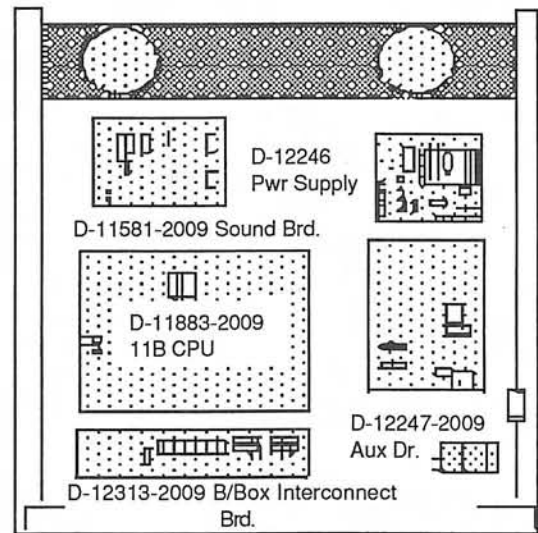
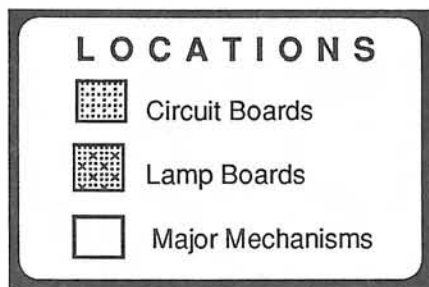
MOUSIN' AROUND CABINET PARTS



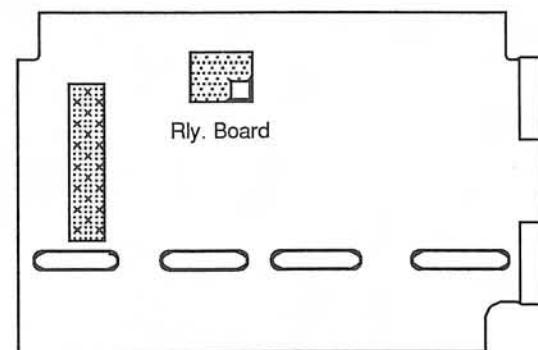
Location Diagram of Game Circuit Boards & Major Mechanisms



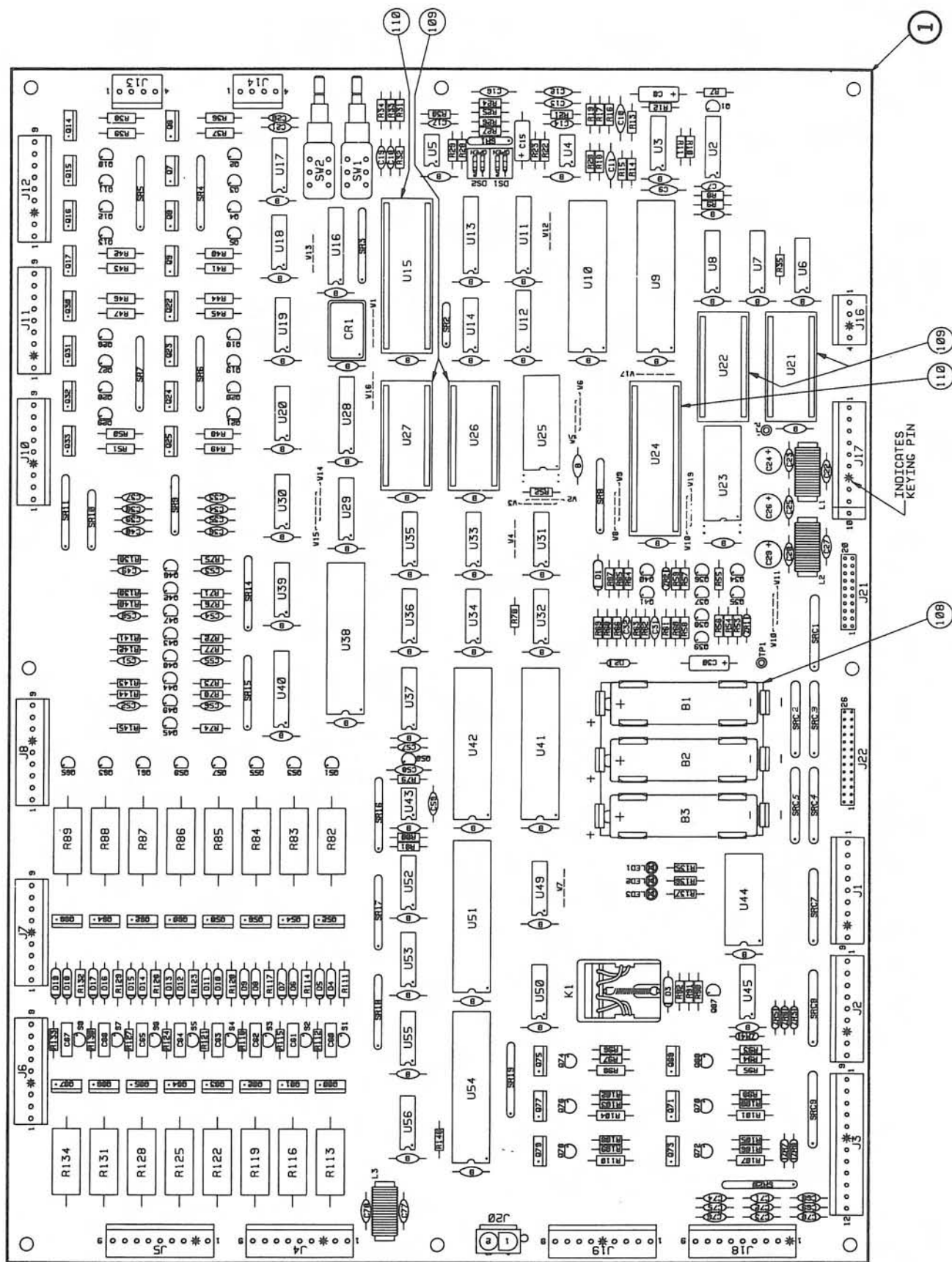
Underside of Playfield,
Viewed from Raised Position



Master Display Bd
Display Panel, Rear View



Insert Board, Inner Side View



SYSTEM 11B CPU BOARD (D-11883)

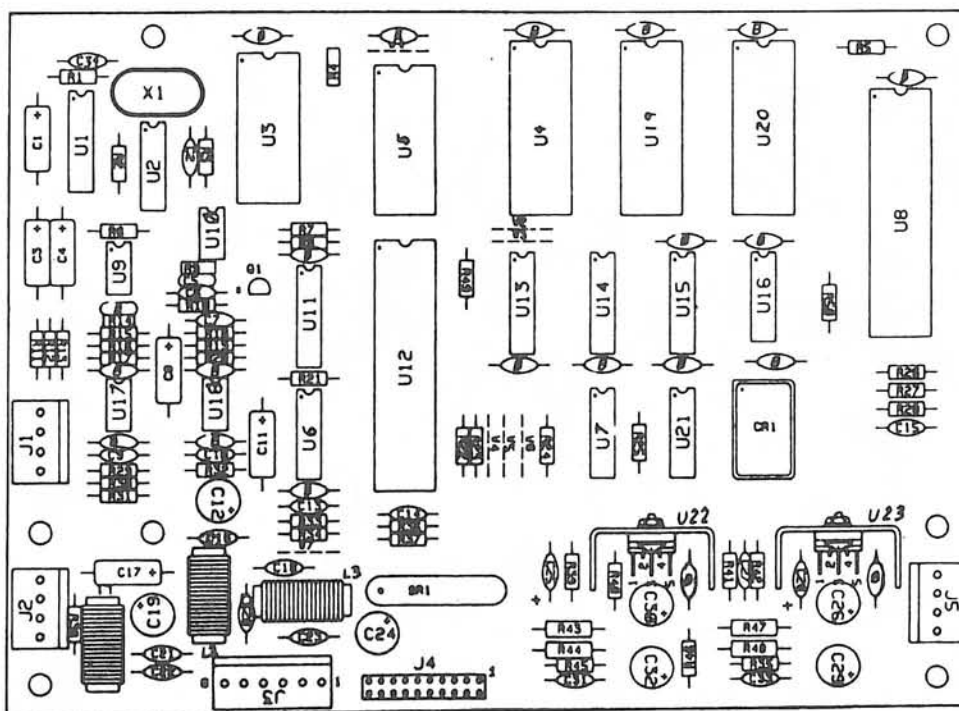
System 11B CPU Board

p/n D-11883-2009

Item	Part No.	Ckt Designator	Description	Item	Part No.	Ckt Designator	Description
1	5764-12206-00		Bare P. C. Board	62	5010-10003-00	R62, R63	Resistor, 390Ω, 5%, 1/4w, C. F.
2	5370-09691-00	U3	IC, CVSD Mod., 55536	63	5010-10171-00	R67	Resistor, 56Ω, 5%, 1/4w, C.F.
3	5370-09321-00	U4, U5	IC, Dual Op Amp, 1458	64	5010-10170-00	R69	Resistor, 47Ω, 5%, 1/4w, C. F.
4	5281-09308-00	U16	IC, Octal Bus Xcvr, 74LS245	65	5010-09160-00	R59, R61, W12, W13	Resistor, 220Ω, 5%, 1/4w, C. F.
5	5430-08972-00	U9, U10, U38, U41, U42, U51, U54	IC, PIA, MC6820/6821	66	5010-09416-00	R33, R34, R71-R78, R135-R137	Resistor, 470Ω, 5%, 1/4w, C. F.
6	5340-10139-00	U25	IC, 2K x 8 CMOS Static RAM	67	5010-09179-00	R9	Resistor, 3.3MΩ, 5%, 1/4w, C. F.
7	5280-09010-00	U44	IC, 4-16 Decoder, 74154	68	Not Used		
8	5281-09246-00	U7, U8, U12	IC, 2-4 Decoder, 74LS139	69	5010-10631-00	R111, R114, R117, R120, R123, R126, R129, R13	Resistor, 1.2KΩ, 5%, 1/2w, C. F.
9	5075-09406-00	ZR3 - ZR8	Diode, Zener, 6.2v, 0.5w	70	Not Used		
10	5164-10998-00	Q42 - Q49	Transistor, NPN, 2N5550, TO-92	71	Not Used		
11	5281-09487-00	U6	IC, Dual D Flip-flop, 74LS74	72	5010-09120-00	R17	Resistor, 270KΩ, 5%, 1/4w, C. F.
12	5431-09449-00	U43	IC, Timer, MC1455	73	5010-09333-00	R15, R16, R18	Resistor, 180KΩ, 5%, 1/4w, C. F.
13	5310-09236-00	U29	IC, 14-b Counter, 4020	74	5010-09324-00	R29, R30	Resistor, 27KΩ, 5%, 1/4w, C. F.
14	5281-09743-00	U32	IC, Quad 2-Input AND, 74LS08	75	5010-09269-00	R20, R21	Resistor, 12KΩ, 5%, 1/4w, C. F.
15	5281-09247-00	U14	IC, Quad 2-Input NOR, 74LS02	76	5010-09356-00	R27, R28	Resistor, 820Ω, 5%, 1/4w, C. F.
16	5281-09235-00	U35	IC, Triple 3-Input NAND, 74LS10	77	5010-09783-00	SR18	SIP, 9R, 10-pin, 6.8KΩ, .125w/R, 5%
17	5280-09013-00	U36	IC, Hex Inverter, 7404	78	5010-09362-00	SR3, SR15, SR17, SR19, SR20	SIP, 9R, 10-pin, 4.7KΩ, .125w/R, 5%
18	5281-09499-00	U31, U34	IC, Quad 2-Input NAND, 74LS00	79	5010-09808-00	SR4, SR6, SR11	SIP, 9R, 10-pin, 560Ω, .125w/R, 5%
19	5281-10014-00	U33	IC, Dual 4-Input NAND, 74LS20	80	5010-09785-00	SR16	SIP, 9R, 10-pin, 2.2KΩ, .125w/R, 5%
20	5281-09486-00	U28	IC, Octal D Flip-flop, 74LS374	81	5010-10472-00	SR14	SIP, 9R, 10-pin, 3.3KΩ, .125w/R, 5%
21	5371-09152-00	U2	IC, D/A Converter, MC1408	82	5010-09669-00	SR8	SIP, 9R, 10-pin, 1.0KΩ, .125w/R, 5%
22	5281-09745-00	U37	IC, 3-8 Decoder, 74LS138	83	5010-09780-00	SR9, SR10	SIP, 4R, 8-pin, 1KΩ, 5%
23	5340-09878-00	U23	IC, 2K x 8 Static RAM, 2016	84	5010-09786-00	SR1, SR2	SIP, 5R, 6-pin, 4.7KΩ, .125w/R, 5%
24	Not Used			85	5010-09792-00	SR5, SR7	SIP, 9R, 10-pin, 2.7KΩ, .125w/R, 5%
25	5281-09867-00	U11, U13, U40	IC, Octal Buffer, 74LS244	86	5060-10396-00	SRC1 - SRC5, SRC7 - SRC9	SIP, 8R, 8C, 10-pin, 4.7KΩ & 470pfd
26	5280-08973-00	U17-U20, U52, U53	IC, Quad 2-Input AND, 7408	87	5010-08774-00	R22	Resistor, 22KΩ, 5%, 1/4w, C. F.
27	5280-08974-00	U55, U56	IC, Hex Inverter, 7406	88	5043-08980-00	C14, C17-C21, C31, C32, C49-C56, C59, + 54 Bypass, marked B	Capacitor, 0.01 μfd, 50v(+80,-20%), Axial
28	5310-09155-00	U30, U39	IC, Quad 2-Input NAND, MC14011	89	5043-09845-00	C22, C23, C25, C27, C28	Capacitor, 1K pfd, 50v(±20%), Axial
29	5280-08948-00	U45, U50	IC, Quad 2-Input NOR, 7402	90	5043-08996-00	C9, C70-75, C77, C78	Capacitor, 0.1 μfd, 50v(±20%), Axial
30	5280-09309-00	U49	IC, Hex Buffer, 7407	91	5040-09343-00	C8, C15	Capacitor, 10 μfd, Electr., 20v(±20%), Axial
31	5671-09019-00	LED1-LED3	LED, Red, Display	92	5043-09844-00	C7	Capacitor, 47 pfd, 50v(±20%), Axial
32	5521-10506-00	CR1	Oscillator, 4 MHz	93	5040-10974-00	C24, C26, C29	Capacitor, 100 μfd, Electr., 25v(+50,-10%), Axial
33	5162-08976-00	Q51, Q53, Q55, Q57, Q59, Q61, Q63, Q65, Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66	Transistor, NPN Darl. 2N6427, TO-92	94	Not Used		
34	5191-08978-00	Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66	Transistor, PNP, TIP42, TO-220	95	5045-09796-00	C60-C67	Capacitor, 0.1 μfd, Polycarbonate Rad., 100v(±10%)
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	96	5043-09065-00	C33-C40, C68, C69, C76, C10, C12	Capacitor, 470 pfd, 50v(±20%), 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	97	5040-09545-00	C30	Capacitor, 22 μfd, Electr., 10v(+50,-10%), Axial
37	5160-10269-00	Q1, Q40	Transistor, NPN, 2N3904, TO-92	98	5041-09031-00	C58	Capacitor, 1 μfd, Tant., 25v(±20%), Axial
38	5190-09016-00	Q39, Q50	Transistor, PNP, 2N4403, TO-92	99	5043-09030-00	C16, C57	Capacitor, 0.047 μfd, 50v(±20%), Axial
39	5130-09014-00	S1-S8	SCR, 30v, 0.8A, 2N5060	100	Not Used		
40	5070-08258-00	D3-D19	Diode, 1N4001	101	5043-09492-00	C11	Capacitor, 100 pfd, ceramic, 100v(±20%)
41	5070-08919-00	D2	Diode, 1N4148, 150mA	102	Not Used		
42	5070-09266-00	D1	Diode, 1N5817, 1.0A	103	5048-10992-00	C13	Capacitor, 4700 pfd, ceramic, 50v(±10%)
43	5075-09018-00	ZR1	Diode, Zener, 1N5996A, 6.8v, 0.5w	104	5551-09822-00	L1-L3	Inductor, 4.7 μH, 3A
44	5075-09059-00	ZR2	Diode, Zener, 1N5990, 3.9v, 0.5w	105	5841-09312-00	SW1, SW2	Switch, Pushbutton, DPDT, 100v, 5A
45	5010-08992-00	R94, R97, R100, R103, R106, R109	Resistor, 560Ω, 5%, 1/4w, C. F.	106	5880-09022-00	B1-B3	Battery, Alkaline, 1.5v, AA
46	5010-09039-00	R56	Resistor, 10Ω, 5%, 1/4w, C. F.	107	20-9491	W18, W19	Bus Wire, Jumper
47	5010-09534-00	W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, W19	Resistor, 0Ω, 5%, 1/4w, C. F.	108	5881-09021-00		Battery Holder, #171
48	5010-08991-00	R31, R32, R35, R52, R55, R68, R92, R146	Resistor, 4.7KΩ, 5%, 1/4w, C. F.	109	5700-10176-00		IC Socket, 28 pin
49	5010-09358-00	R54, R57, R58, R64, R66, R138-R145	Resistor, 1.0KΩ, 5%, 1/4w, C. F.	a)	A-5343-2009-1	U26	IC, Game ROM 2, 27256
50	5010-09113-00	R79	Resistor, 33KΩ, 5%, 1/4w, C. F.	b)	A-5343-2009-2	U27	IC, Game ROM 1, 27256
51	5010-08983-00	R7, R8, R10, R70, R80	Resistor, 3.3KΩ, 5%, 1/4w, C. F.	c)	A-5343-2009-3	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.	d)	A-5343-2009-4	U21	IC, Sound ROM 1, 27256
53	5010-09086-00	R81	Resistor, 6.8KΩ, 5%, 1/4w, C. F.	110	5700-08985-00		IC Socket, 40 pin
54	5010-09363-00	R3	Resistor, 5.6KΩ, 5%, 1/4w, C. F.	a)	5400-09150-00	U15	IC, μProcessor, 6802
55	5010-08997-00	R23, R24, R91, R93, R96, R99, R102, R105, R108, R112, R115, R118, R121, R124, R127, R130, R133	Resistor, 2.7KΩ, 5%, 1/4w, C. F.	b)	5400-09150-00	U24	IC, μProcessor, 6802
56	5012-09037-00	R113, R116, R119, R122, R125, R128, R131, R134	Resistor, 0.4Ω, 5%, 3w, Wire-Wnd.	111	5824-09248-00	TP1, TP2	Test Point
57	5010-08993-00	R36-R51, R95, R98, R101, R104, R107, R110	Resistor, 68Ω, 5%, 1/2w, C. F.	112 - 115	Not Used		
58	5012-10860-00	R82-R89	Resistor, 27Ω, 5%, 2w, C. F.	116	20-9229		Thermal Compound
59	Not Used			117	5580-08994-01	K1	Relay, 4-pole, 40Ω, 6v
60	Not Used			118	5791-10862-09	1J1, 1J2, 1J4-1J8, 1J10-1J12, 1J17-1J19	Connector, 9 pin (Hdr)
61	5010-10987-00	R19	Resistor, 56KΩ, 5%, 1/4w, C. F.	119	5791-10862-04	1J13, 1J14, 1J16	Connector, 4 pin (Hdr)
				120	5791-10862-12	1J3	Connector, 12 pin (Hdr)
				121	Not Used		
				122	5791-10850-00	1J22	Connector, 26 pin Ribbon (Hdr)
				123	5791-09437-00	1J21	Connector, 20 pin Ribbon (Hdr)

NOTES:

- For Schematic, refer to drawing #16-9019.
- 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, W19.



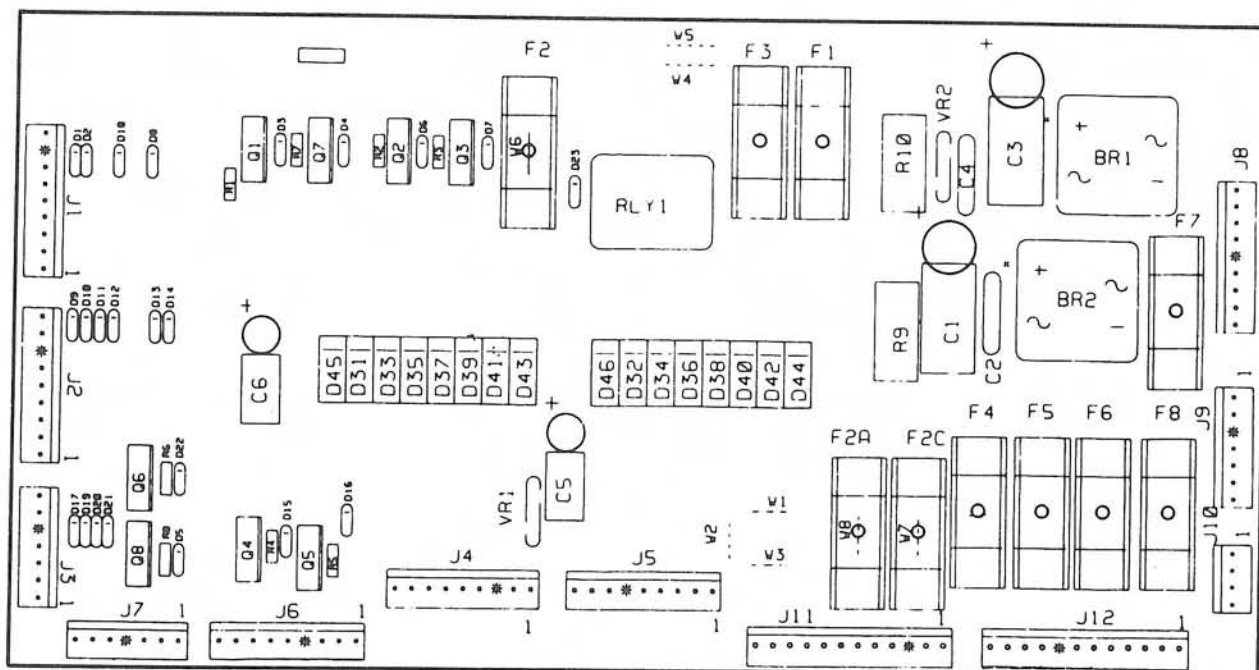
Audio Board Assembly

p/n D-11581-2009

Part No.	Ckt Designator	Description	Part No.	Ckt Designator	Description
5766-12130-00		Bare P. C. Board	5010-08998-00	R2, R3,	Resistor, 2.2K, 1/4w, 5%
5371-11087-00	U1	IC, D/A Conv, YM3012	5010-08983-00	R7-R9	Resistor, 3.3K, 1/4w, 5%
a) 5700-09006-00		Socket, IC, 16-pin (U1)	5010-08991-00	R1, R4, R5, R11,	Resistor, 4.7K, 1/4w, 5%
5370-11086-00	U3	IC, Sound Processor, YM2151		R12, R26 - R28, R33,	
a) 5700-09004-00		Socket, IC, 24-pin (U3)		R36, R37, R49, R50	
5400-10320-00	U8	IC, μ Processor, MC68B09E	5010-10985-00	R14, R15	Resistor, 20K, 1/4w, 5%
a) 5700-08985-00		Socket, IC, 40-pin (U8)	5010-09034-00	R17	Resistor, 10K, 1/4w, 5%
A-5343-2009-5	U4	IC, Audio ROM 1	5010-09324-00	R6,	Resistor, 27K, 1/4w, 5%
A-5343-2009-6	U19	IC, Audio ROM 2	5010-09162-00	R39	Resistor, 100K, 1/4w, 5%
A-5343-2009-7	U20	IC, Audio ROM 3	5010-09331-00	R16	Resistor, 13K, 1/4w, 5%
a) 5700-10176-00		Socket, IC, 28-pin (U4, U19)	5010-09219-00	R38	Resistor, 8.2K, 1/4w, 5%
5371-09152-00	U11	IC, D/A Convtr, MC1408	5010-10258-00	R40	Resistor, 1M, 1/4w, 5%
5430-10322-00	U12	IC, PIA, MC68B21	5010-09179-00	R10	Resistor, 3.3M, 1/4w, 5%
5340-10139-00	U5	IC, RAM/S 5516-2 2Kx8	5010-09534-00	W9	Resistor, 0 Ω , 1/4w, 5%
5281-09487-00	U16	IC, Dual D Flipflop, 74LS74	5040-09343-00	C1, C3, C4, C8	Capacitor, 10 μ fd, 20v, $\pm$ 20%
5281-10043-00	U13	IC, 74LS175	5040-10974-00	C12, C19, C24	Capacitor, 100 μ fd, 35v
5281-09235-00	U21	IC, Triple NAND, 74LS10	5040-09776-00	C26, C30	Capacitor, 470 μ fd, 16v; +50, -10%
5370-09321-00	U9, U10, U17	IC, Op Amp, MC1458	5040-12006-00	C29, C32	Capacitor, 1000 μ fd, 16v, 20%
5281-09215-00	U2	IC, Hex Inv, 74LS04	5041-09243-00	C25, C28	Capacitor, 10 μ fd, 10v, $\pm$ 10%
5281-09246-00	U14	IC, 2-4 Dec, 74LS139	5043-08980-00	C5, B (17)*	Capacitor, 0.01 μ fd, 50v, +80, -20%
5281-09745-00	U15	IC, Dual Mux, 74LS138	5043-08996-00	C31, C33	Capacitor, 0.1 μ fd, 50v, $\pm$ 20%
5370-09156-00	U22, U23	IC, Audio Amp, TDA2002	5043-09065-00	C13 - C15	Capacitor, 470 pfd, 50v, $\pm$ 20%
a) 5705-09199-00		Heatsink, #6030B	5043-09492-00	C2, C34	Capacitor, 100 pfd, 50v, $\pm$ 10%
b) 4006-01003-06		Mach. Screw, 6-32 x 3/8	5043-09844-00	C6	Capacitor, 47 pfd, 50v, $\pm$ 20%
c) 4406-01117-00		Nut, 6-32 Hex.	5043-09845-00	C16, C18, C20 -	Capacitor, 1000 pfd, 50v, $\pm$ 20%
d) 4703-00007-00		Lockwasher, #6 Ext.		C23, C27	
5160-10269-00	Q1	Transistor, 2N3904, NPN	5520-09020-00	X1	Crystal, 3.58 MHz
5060-10396-00	SP1	SIP 4.7K & 470pfd, 8R8C	5521-10931-00	CR1	Oscillator, 8 MHz
5010-09181-00	R44, R48	Resistor, 1.0 Ω , 1/2w, 5%	5551-09822-00	L1 - L3	Inductor, 4.7 μ H, 3A
5010-09161-00	R35, R45	Resistor, 2.2 Ω , 1/4w, 5%	5791-09437-00	J4	Connector, 20 pin, (Hdr), Rib. Cbl
5010-09361-00	R43, R46, R47	Resistor, 220 Ω , 1/2w, 5%	5791-10862-04	J1, J2, J5	Connector, 4 pin (Hdr)
5010-09358-00	R41, R42	Resistor, 1K, 1/4w, 5%	5791-10862-06	J3	Connector, 6 pin (Hdr)
			16-8850-250		P.C.B. I.D. Label
			20-9229		Thermal Compound

NOTES:

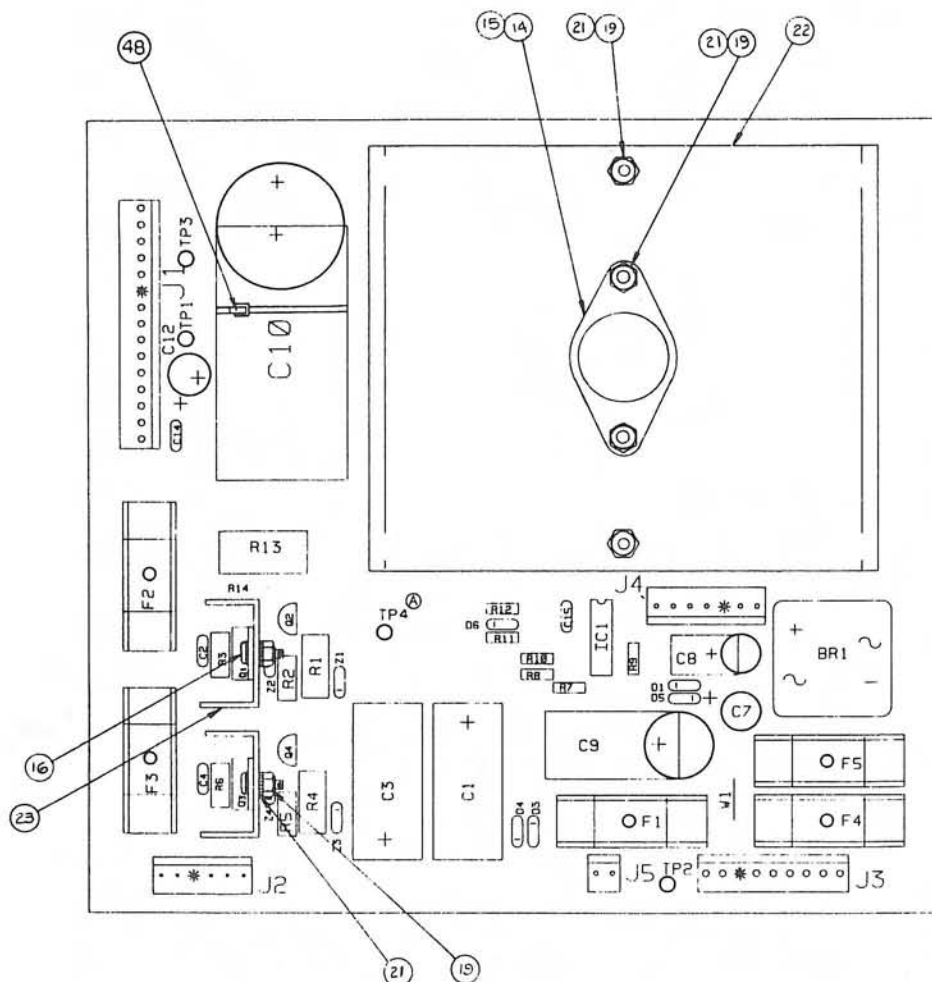
- * 17 capacitors (shown on diagram with "B" symbol) provide +5VDC filtering for ICs.
- All capacitors are ceramic, 50v, axial, unless otherwise noted.
- All resistors are 5%, 1/4w, Carbon Film, unless otherwise noted.



Aux Power Driver Unit Board

p/n D-12247-2009

Part No.	Ckt Designator	Description
5763-12184-00		Bare P.C. Board
5040-09537-00	C1, C3	Capacitor, 100 μ fd., 100v, Radial
5040-12181-00	C5, C6	Capacitor, 10 μ fd., 100v, Radial
5043-09072-00	C2, C4	Capacitor, 0.1 μ fd., 500v
5010-09160-00	R1 - R8	Resistor, 220 Ω , 1/4w C.F., 5%
5012-12238-00	R9	Resistor, 3.3K Ω , 5w, 10%
5010-09534-00	W1, W3, W4, W6	Resistor, 0 Ω , 1/4w
5017-12180-00	VR1, VR2	Varistor, 100v
5100-09690-00	BR1, BR2	Bridge Rectifier, 35A, 200v
5070-08785-00	D1 - D23	Diode, 1N4003
5070-09045-00	D31 - D46	Diode, MR501
5191-12179-00	Q1 - Q8	Transistor, TIP36C
5580-09555-01	K1	Relay, DPDT, 13A
5733-12060-01		Fuse Holder
5731-08665-00	F5, F6	Fuse, 2A, S-B, 250v
5731-09128-00	F1, F2A, F3, F4	Fuse, 2-1/2A, S-B, 250v
5731-09651-00	F2C,	Fuse, 5A, S-B, 250v
5731-06314-00	F7	Fuse, 4A, S-B, 250v
5731-09432-00	F8	Fuse, 7A, S-B, 250v
5791-10862-09	J1, J2, J4, J6, J8	Connector, 9-pin Hdr, Sq Pin
5791-10862-07	J3, J7, J9	Connector, 7-pin Hdr, Sq Pin
5791-10862-12	J11, J12	Connector, 12-pin Hdr, Sq Pin
5791-10862-04	J10	Connector, 4-pin Hdr, Sq Pin
16-8850-252		P.C.B. I.D. Label



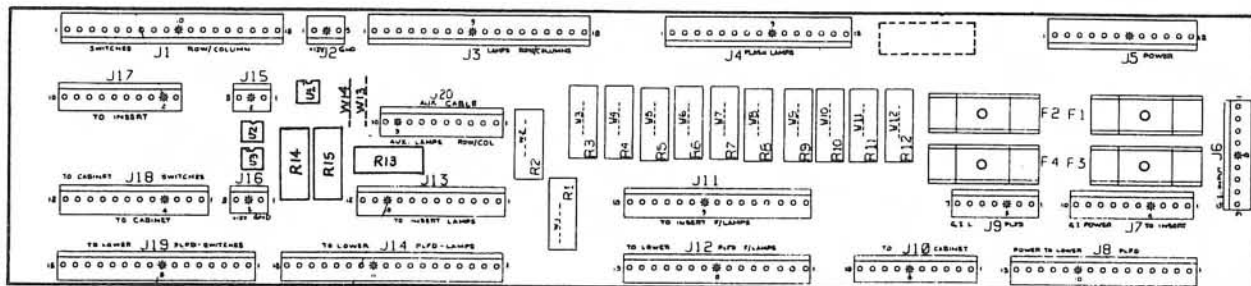
Power Supply

p/n D-12246

Item	Part No.	Ckt Designator	Description	Item	Part No.	Ckt Designator	Description
1	5765-12317-00		Power Supply PCB	26	5075-09060-00	ZR2, ZR4	Zener, 1N4764, 100v, 1w
2	5733-12060-01	F1-F5	Fuse Holder	27	5460-09424-00	IC1	IC, Volt. Reg., MC1723C5
3	5731-09432-00	F4, F5	Fuse, 7A., S-B, 250v	28	5010-09069-00	R3, R6	Resistor, 330K, 5%, 1/2w, C.F.
4	5731-12328-00	F1	Fuse, 3/8A., S-B, 250v	29	5010-10631-00	R2, R5	Resistor, 1.2K, 5%, 1/2w
5	5730-12327-00	F2, F3	Fuse 1/8 A., 250v	30	5010-09536-00	R1, R4	Resistor, 39K, 5%, 1w
6	5791-10862-15	J1	Connector, 15-pin Hdr, Sq Pin .156	31	5013-09426-00	R7	Resistor, 2.15K, 1%, 1/4w, C. F.
7	5791-10862-06	J2	Connector, 6-pin Hdr, Sq Pin .156	32	5013-09427-00	R8	Resistor, 4.99K, 1%, 1/4w, C. F.
8	5791-10862-09	J3	Connector, 9-pin Hdr, Sq Pin .156	33	5010-09541-00	R9	Resistor, 2.7K, 2%, 1/4w, C. F.
9	5100-09690-00	BR1	Bridge Rectifier, 35A., 200V	34	5010-09085-00	R10	Resistor, 1.5K, 5%, 1/4w, C. F.
10	5164-12154-00	Q1	Transistor, MJE15030, NPN	35	5010-09428-00	R11	Resistor, 1.5K, 2%, 1/4w, C. F.
11	5194-12155-00	Q3	Transistor, MJE15031, PNP	36	5010-09508-00	R12	Resistor, 270Ω, 2%, 1/4w, C. F37
12	5194-09055-00	Q2	Transistor, MPSD52, PNP	37	5012-09429-00	R13	Resistor, 0.12Ω, 5%, 5w
13	5164-09056-00	Q4	Transistor, MPSD02, NPN	38	5040-12324-00	C1, C3	Capacitor, 150 mfd, 160v, radial
14	5162-09425-00	Q5	Transistor, 2N6057, NPN	39	5043-09072-00	C2, C4	Capacitor, 0.1 mfd, 500v, disc
15	5701-09652-00		Thermal Pad T0-3	40	5040-09421-00	C7	Capacitor, 100 mfd, 25v, radial
16	4006-01003-06		Mach. Screw, 6-32 x 3/8	41	5040-09422-00	C8	Capacitor, 47 mfd, 50v, radial
17	4006-01003-08		Mach. Screw, 6-32 x 1/2	42	5040-09420-00	C9	Capacitor, 1000 mfd, electr, 25v, axial or radial
18	20-9229		Thermal Compound	43	5040-08893-00	C10	Capacitor, 18,000 mfd, electr, 20v, axial
19	4406-01117-00		Nut, 6-32 Hex.	44	5040-09419-00	C12	Capacitor, 330 mfd, electr, 10v, radial
20	5010-09534-00	W1	Resistor, 0Ω	45	5043-09446-00	C14	Capacitor, 0.1 mfd, 50v, disc
21	4703-00007-00		Lockwasher, #6 Ext.	46	5043-09065-00	C15	Capacitor, 470 pfd
22	5705-12330-00		Heatsink 4"	47	5824-09248-00	TP1-TP4	Terminal, #1502-1 (Test Post)
23	5705-09199-00		Heatsink 6030B	48	03-7947		Tie Wrap, 8" Long
24	5070-09054-00	D1, D3 - D6	Diode, 1N4004				
25	5075-09059-00	ZR1, ZR3	Zener, 1N5990, 3.9v, 1/2w				

NOTES:

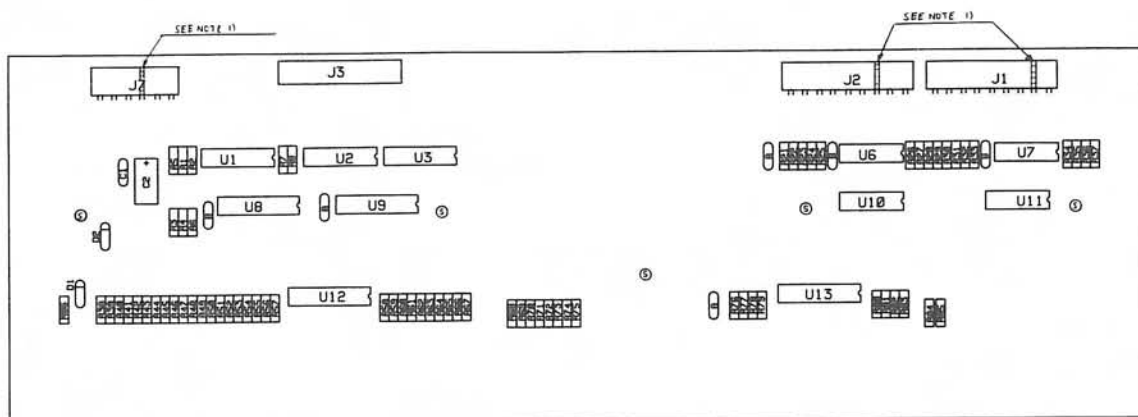
- Heat sink compound must be applied between transistor and heat sink.
- Observe index mark on integrated circuit, polarity of capacitors and diodes, and position of transistors.
- The view of Q5 and its related heat sink and hardware is from the bottom of the heatsink, to clarify installation.



Backbox Interconnect Board

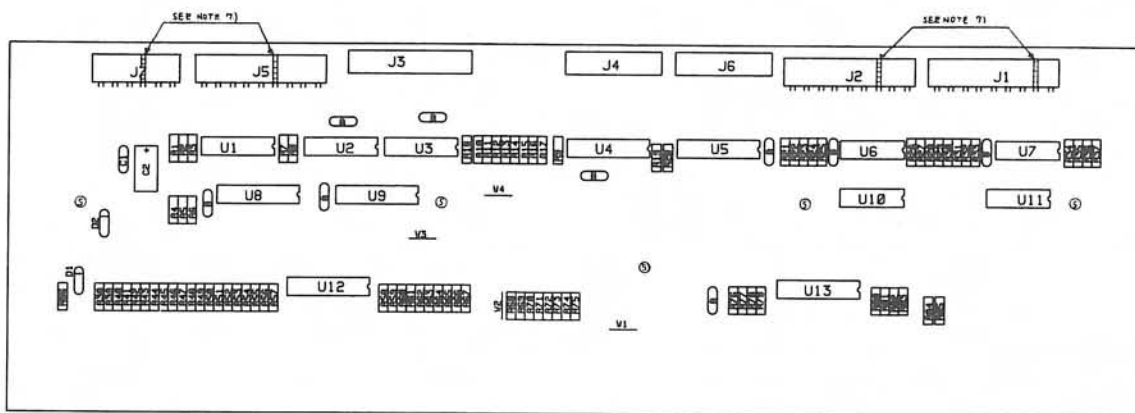
p/n D-12313-2009

Part No.	Ckt Designator	Description
5768-12332-00		Master Interconnect Board
5010-09534-00	R10, R11, R12	Resistor, 0Ω
5012-12238-00	R14, R15	Resistor, 3.3KΩ, 5w, 10%
5012-12337-00	R13	Resistor, 1.5KΩ, 5w, 10%
5012-10023-00	R1, R2, R6, R7	Resistor, 4Ω, 5w, 10%
5012-12163-00	R3, R8	Resistor, 11Ω, 5w, 10%
5012-10024-00	R4, R5, R9	Resistor, 5.6Ω, 5W, 10%
5490-10892-00	U1 - U3	Opto Isolator 4N25
5731-09651-00	F1-F4	Fuse, 5A.S.B., 250v
5733-12060-01		Fuse Holder, F1-F4
5791-10862-03	J2, J16	Connector, 3-pin Hdr Sq Pin .156
5791-10862-07	J9	Connector, 7-pin Hdr Sq Pin .156
5791-10862-09	J6	Connector, 9-pin Hdr Sq Pin .156
5791-10862-10	J7, J10, J20	Connector, 10-pin Hdr Sq Pin .156
5791-10862-12	J5, J13, J18	Connector, 12-pin Hdr Sq Pin .156
5791-10862-15	J8	Connector, 15-pin Hdr Sq Pin .156
5791-10862-16	J4, J11, J12, J19	Connector, 16-pin Hdr Sq Pin .156
5791-10862-18	J1, J3, J14	Connector, 18-pin Hdr Sq Pin .156
16-8850-243		P.C.B. I.D. Label



Bally Left Display Board D-12706

DESCRIPTION	QTY.	DESIGNATION NO.	PART NUMBER
Axial Cap., 0.01nfd, 50v, +80, -20%	6	B (Bypass Cap)	5043-08980-00
Axial Cap., 0.1nfd, 50v, +80, -20%	1	C1	5043-08996-00
Axial Cap., 10nfd, 25v, ±20%	1	C2	5040-09343-00
Zener, 1N4740, 10v	2	D1, D2	5075-09135-00
Display, 16-Character A/N	1	DSPL1	5670-12308-00
9-Pin Header, Right Angle, .156	2	J1, J2	5791-10869-09
26-Pin Header, Right Angle, .100	1	J3	5791-10851-00
6-Pin Header, Right Angle, .156	1	J7	5791-10869-06
Resistor, 18KW, 1/4w, 5%	25	R1-R8, R21-R37	5010-08773-00
Resistor, 100KW, 1/4w, 5%	32	R38, R40, R42, R44, R46, R48, R50, R52, R54, R55- R61, R63, R65, R67, R69, R71, R73, R75-R83, R85	5010-09162-00
Resistor, 10KW, 1/2w, 5%	9	R39, R41, R43, R47, R53 R66, R70, R72, R84	5010-08981-00
Resistor, 1MW, 1/4w, 5%	1	R86	5010-10258-00
Resistor, 8.2KW, 1/2w, 5%	7	R45, R49, R51, R62, R64, R68, R74	5010-10927-00
I.C. 4049	3	U1-U3	5310-08975-00
I.C. 4001		U6, U7, U10, U11	5310-09882-00
I.C. 7180, Cathode Driver	2	U8, U9	5680-08969-00
I.C. 6118, Anode Driver	2	U12, U13	5680-08968-00
Bally-Hi-Display PCB	1		5768-12408-00
Support Display5		S (Support)	03-8088-1



Bally Right Display Board D-12502-1

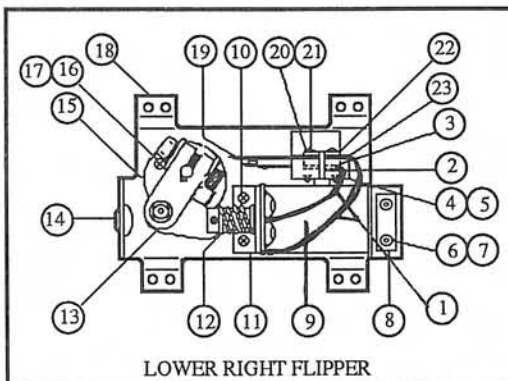
DESCRIPTION	QTY.	DESIGNATION NO.	PART NUMBER
Axial Cap., 0.01mfd, 50v, +80, -20%	9	B (Bypass Cap)	5043-08980-00
Axial Cap., 0.1mfd, 50v, +80, -20%	1	C1	5043-08996-00
Axial Cap., 10mfd, 25v, ±20%	1	C2	5040-09343-00
Zener, 1N4740, 10v	2	D1, D2	5075-09135-00
Display, 16-Character A/N	1	DSPL1	5670-12308-00
9-Pin Header, Right Angle, .156	3	J1, J2, J5	5791-10869-09
26-Pin Header, Right Angle, .100	1	J3	5791-10851-00
6-Pin Header, Right Angle, .156	1	J7	5791-10869-06
Resistor, 18KW, 1/4w, 5%	25	R1-R8, R21-R37	5010-08773-00
Resistor, 100KW, 1/4w, 5%	32	R38, R40, R42, R44, R46, R48, R50, R52, R54, R61, R63, R65, R67, R69, R71, R73, R75-R83, R85	5010-09162-00
Resistor, 1MW, 1/4w, 5%	1	R86	5010-10258-00
Resistor, 8.2KW, 1/2w, 5%	7	R45, R49, R51, R62, R64, R68, R74	5010-10927-00
Resistor, 0W	2	W3, W4	5010-09534-00
I.C. 4049	3	U1-U3	5310-08975-00
I.C. 4001	4	U6, U7, U10, U11	5310-09882-00
I.C. 7180, Cathode Driver	2	U8, U9	5680-08969-00
I.C. 6118, Anode Driver	2	U12, U13	5680, 08968-00
Bally-Lo-Display PCB	1		5768-12378-00
Support Display	5	S (Support)	03-8088-1
Assembly, I.D. Label	1		16-8850-251

Lower Right Flipper

p/n C-11626-R-3

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, SH
7	4701-00004-00	Lockwasher, #10 split
8	A-12111	Flipper Stop Assembly
9	FL-11630	Flipper Coil (Red), (* - Refer to Note 3)
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, Right
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.)	03-8050-1	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	4105-01019-10	Sh. Metal Screw, #5 x 5/8
21	4701-00002-00	Lockwasher, #6 split
22	23-6622	Tape, Double-sided
23	03-7811	End of Stroke (EOS) Switch

** - Also see separate diagram



LOWER RIGHT FLIPPER

Flipper Assembly Notes:

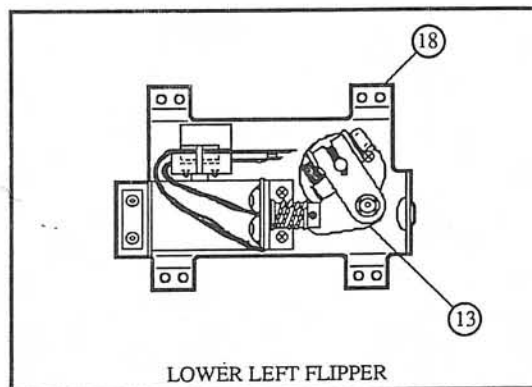
- Each Flipper Assembly on the Lower Playfield (and the two Lower Flipper Assemblies on the Upper Playfield) is mounted beneath the playfield, in conjunction with the plastic Flipper Paddle and Shaft (20-9250-5) and flipper Rubber (23-6519-4) on the upper side of the playfield. The Upper Flipper Assembly on the Upper Playfield uses a plastic Flipper Paddle and Shaft (C-11927-5) and flipper Rubber (23-6553-4).
- 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.
- Not Used.
- All moving elements of the assembly must operate freely, with no evidence of binding.
- The large end of the Coil Plunger Spring (item 12) must fit within the four lugs of the Solenoid Bracket.
- For coil replacement, remove the Solenoid Bracket (item 11) to prevent screw damage.
- Use Loctite™ 242 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.
- When replacing the Bumper Plug (item 14) to restore proper flipper operation, readjust the flipper paddle and shaft position.
- Solid color blue wire connects to the banded end of each diode, mounted on the connector end of the Flipper Coil (item 9). Trace color wire connects to the unbanded end of the diode.

Lower Left Flipper

p/n C-11626-L-3

(Parts listed replace same Items of C-11626-R-3)

Item	Part No.	Description
13	B-10655-L	Crank Link Assembly, Left
g)	B-10657-L	Flipper Crank Assembly, Left
1.)	01-8073-L	Flipper Crank, Left
18	C-11627-L	Flipper Base Assy, Left



LOWER LEFT FLIPPER

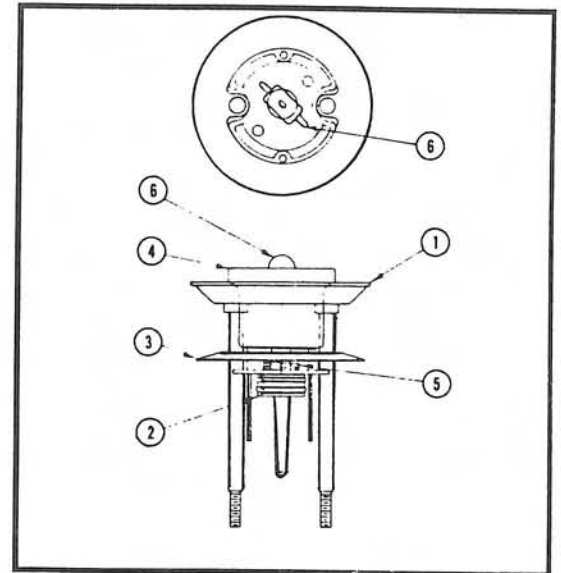
Thumper (Jet) Bumper Assembly

p/n B-9414-2

Item	Part No.	Description
1	A-4754	Bumper Ring Assy
2	03-6009-A5	Bumper Base-Wht
3	03-6035-6	Bumper Wafer-Yel
4	03-7443-5	Bumper Body-Wht
5	10-7	Spring-Jet Bumper
6	A-11199	Socket & Bulb Assy

Associated Parts:

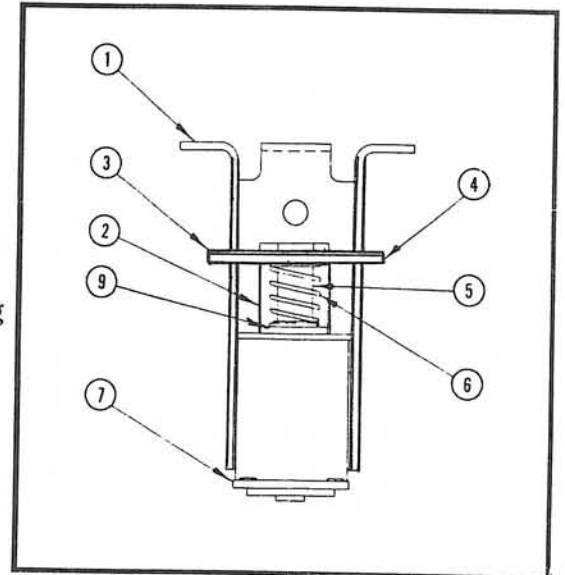
B-12030-2	Switch & Diode Assy
SW-11A-37	Switch Assembly
5070-06258-00	Diode, 1N4001, 1.0A
B-12029-2	Switch & Brkt Assy



Thumper (Jet) Bumper Coil Assembly

p/n B-9415-1

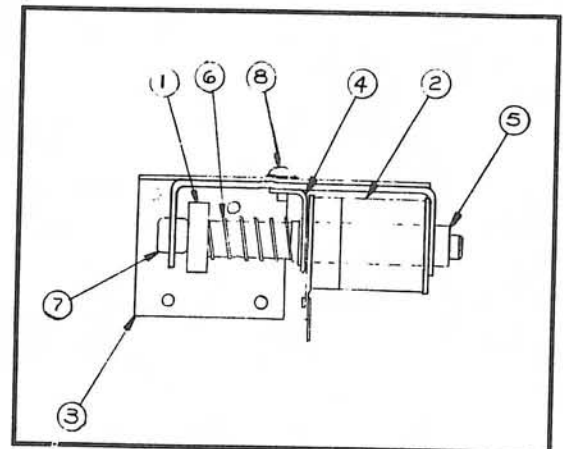
Item	Part No.	Description
1	B-7417	Bracket & Stop Assy
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link (Plate), Steel
4	01-5493	Armature Link (Plate), Bakelite
5	02-3406-1	Coil Plunger
6	10-326	Armature (Compression) Spring
7	AE-23-800	Coil Assembly
8	4006-01017-04	Mach. Screw, 6-32 x 1/4
9	03-7066	Coil Tubing

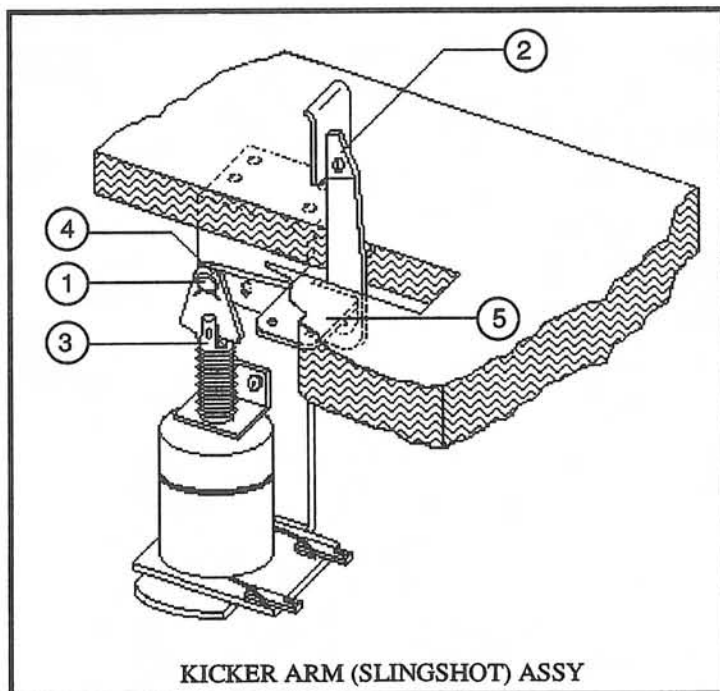


Bottom Arch Kicker Assembly (Kickback)

p/n B-11873-1

Item	Part No.	Description
1	A-6306-2	Bell Armature
2	AE-24-900	Coil Assembly
3	B-7409-2	Mtg. Bracket Assembly
4	01-8-508-T	Coil Retain Bracket
5	03-7067-5	Coil Tubing
6	10-135	Solenoid Spring
7	23-6420	Rubber Grommet
8	4008-01017-05	Mach. Screw 8-23 x 5/16





Kicker Arm ("Slingshot") Assembly

p/n B-12665
(Left & Right Kickers)

Item	Part No.	Description
1	12-6227	Clip, Hairpin
2	A-12664	Kicker Crank Assembly
3	A-5103	Coil Plunger Assembly
	02-2364	Coil Plunger
	20-8716-5	Roll Pin, 1/8 x 7/16
	03-8085	Armature Link
4	4700-00003-00	Flat Washer, .265 x .500 x .067
5	A-5653	Mounting Bracket Assy

Associated Parts for Right Kicker

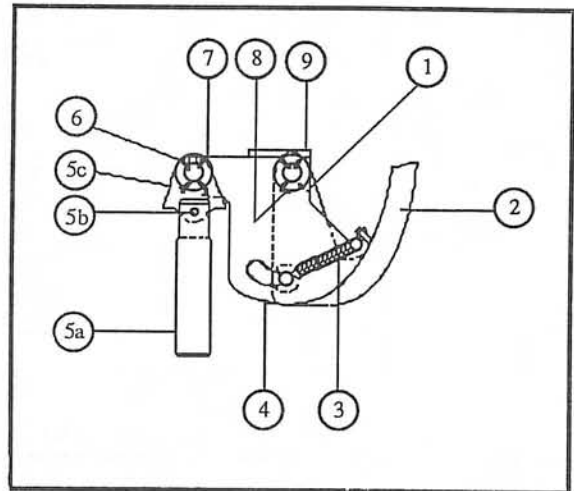
Part No.	Description
B-11203-L-1	Coil & Bracket Assy
B-7572-1	Bracket & Stop Assy
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
AE-26-1500	Coil Assembly
03-7066	Coil Tubing

Associated Parts for Left Kicker

Part No.	Description
B-11203-R-1	Coil & Bracket Assy
B-7572-1	Bracket & Stop Assy
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
AE-26-1500	Coil Assembly
03-7066	Coil Tubing

Ball Shooter Lane Feeder p/n C-9638-1

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

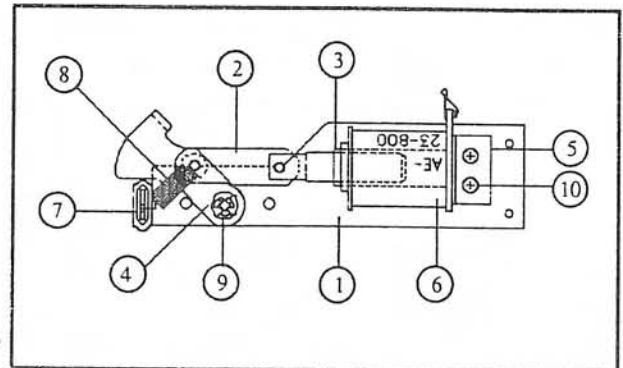


Associated Parts

B-9362-L-1	Coil & Bracket Assy
B-7572-1	Bracket & Stop Assy
01-8-508-S	Coil Retaining Bracket
4006-01017-06	Mach. Screw, 6-32 3/8
4406-01119-00	Nut, 6-32 ESN
AE-23-800	Coil Assembly
03-7066	Coil Tubing

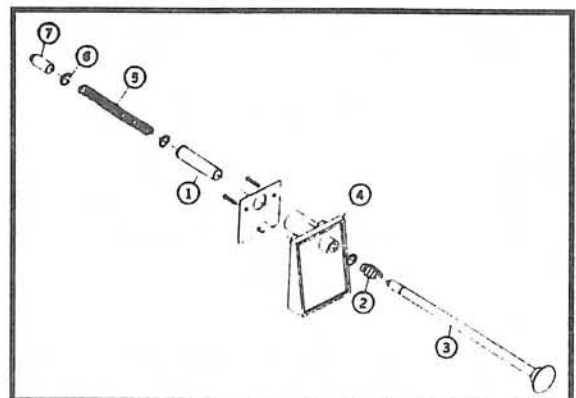
Outhole Kicker Assembly p/n B-8039-2

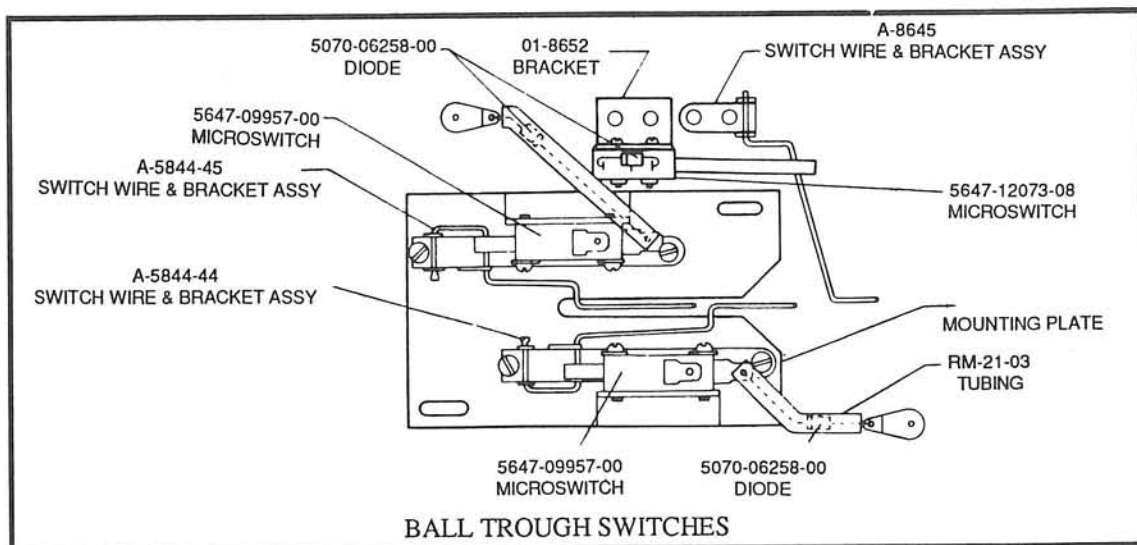
Item	Part No.	Description
1	A-6378	Mounting Plate Assembly
2	A-8335	Coil Plunger Assembly
a)	02-2364	Coil Plunger
b)	20-8716-5	Roll Pin, 1/8 x 7/16
c)	01-4251	Ball Return Link
3	03-7066	Coil Tubing
4	A-6889	Kicker Lever Assembly
5	A-8038	Coil Stop Assembly
6	AE-23-800	Coil Assembly
7	03-7176-1	Striker Ring
8	10-101-4	Spring-Reset
9	20-8712-25	"E" Ring, 1/4" Shaft
10	4006-01003-03	Mach. Screw, 6-32 x 3/16



Ball Shooter p/n B-12445-1

Item	Part No.	Description
1	03-7357	Sleeve
2	10-149	Rod Spring
3	20-9253-7	Rod Assembly
4	21-6645-1	Ball Shooter Housing
5	10-148-1	Shooter Spring
6	20-8718-1	"C" Ring
7	23-6327	Shooter Tip





Ball Trough Switches

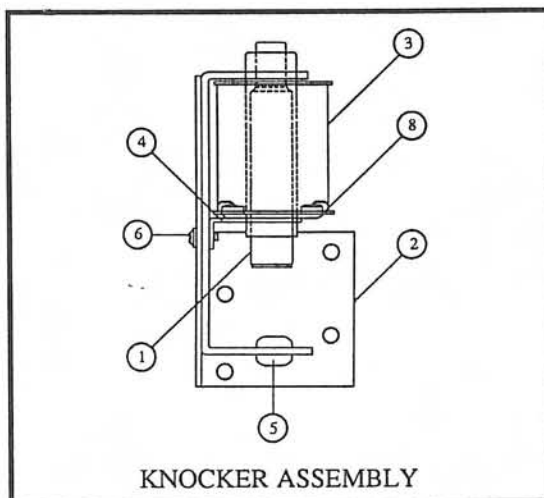
(Viewed from underside of playfield to show locations)

Part No.	Description
B-8925	Ball Trough Switch Plate Assy
A-5844-44	Switch Wire & Bracket Assy
A-5844-45	Switch Wire & Bracket Assy
A-8924	Bracket & Mounting Plate Assy
5647-09957-00	μswitch; Cntr & L Ball Trough
4004-01003-10	Mach. Screw, 4-40 x 5/8
4005-01005-02	Mach. Screw, 5-40 x 1/8
5070-06258-00	Diode, 1N4001, 1.0A
5825-06522-00	Solder Lug-Flat, #6
RM-21-03	Insulating Tubing, #10 x 1.75
A-11680	Ball Trough Switch, Right
5647-12073-08	Submini Switch
5070-06258-00	Diode, 1N4001, 1.0A
A-8645	Switch Wire & Bracket Assy

Knocker Assembly

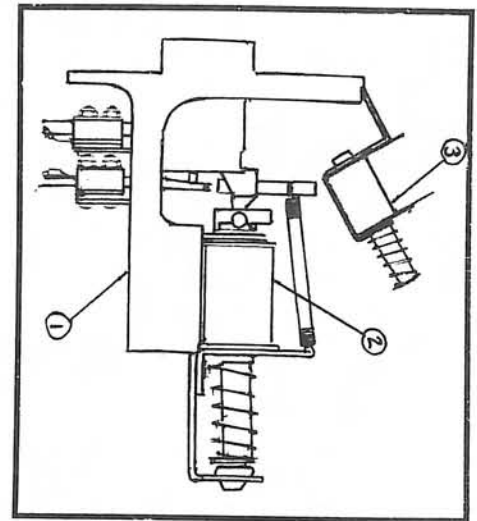
p/n B-10686-1

Item	Part No.	Description
1	A-5387	Coil Plunger Assembly
a)	02-2653	Coil Plunger
b)	03-6013	Bell Arm Ext.
2	B-7409-2	Mtg. Bracket Assembly
3	AE-23-800	Coil Sub-Assembly
4	01-8-508-T	Coil Retaining Bracket
5	23-6420	Rubber Grommet
6	4008-01017-06	Mach. Screw, 8/32 x 3/8
7	H-11835	Knocker Cable
8	03-7067-5	Coil Tubing



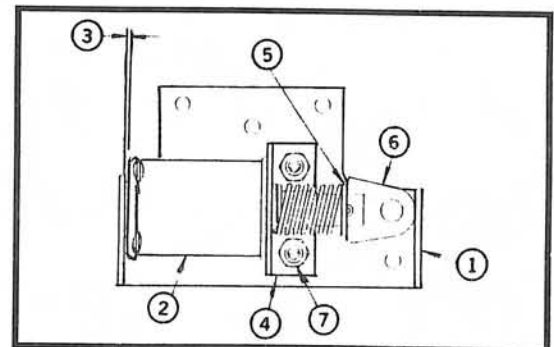
Trap (Ball Eater) Assembly p/n B-20-9629

Item	Part No.	Description
1	20-9629	Ball Eater
2	AE-26-1400	Coil Sub-assembly
3	SM1-28-800	Coil Sub-assembly



Drop Kick Mech. Assembly (Mouse Hole Exit) p/n B-13081

Item	Part No.	Description
1	B-13082	Ball Tray Mech.
2	AE-26-1200	Coil Assembly
3	03-7066	Coil Tubing
4	01-9350	Coil Retaining Brkt.
5	10-399	Compression Spring
6	A-5103	Plunger Assembly
7	4406-01119-00	#6-32 Stop Nut

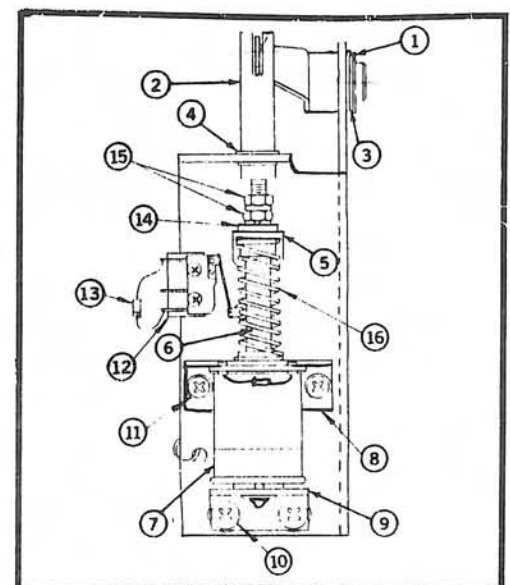


Ball Deflector (Diverter) p/n C-12902-1

Item	Part No.	Description
1	20-8712-50	"E" Ring 1/2 S
2	A-12957-1	D/A Shaft Actuator Assy.
3	0017-00104-0045	1/2 Flat Washer
4	20-8790-05	Nyliner
5	01-8640	Pin Mtg. Brkt.
6	02-4302	Threaded Plunger
7	AE-23-800	Coil Assembly
8	01-8639	Coil Support Bracket
9	A-10821	Flipper Stop Brkt. Assy.
10	4010-01008-06	Mach. Screw 10-32 x 3/8
11	4006-01027-06	#6-32 P-RWH-PPH-N
12	01-8600	Switch Insulator
13	A-12953	Mini μ Switch Assy.
14	4700-00060-00	Washer #10 Flat
15	4410-01130-00	Hex Nut 10-32
16	10-406	Compression Spring
Not Shown	02-4304	Cam Pivot Pin
Not Shown	03-8090	Flat Cam
Not Shown	10-392	Spring-Extension
Not Shown	10-401	Spring-Extension

Associated Part:

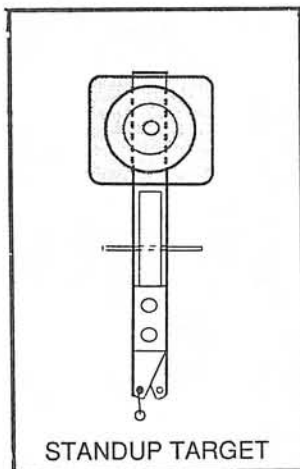
B-12858	Diverter Mech. Assembly
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Ball Eater, Drop Kick Mech.,
& Diverter 2-17

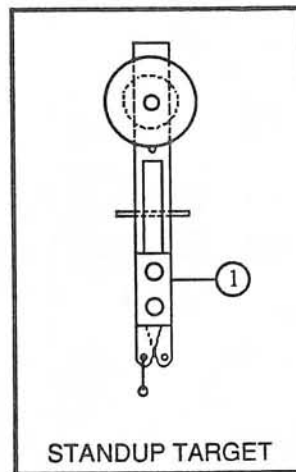
Stand-up Target Assembly

p/n B-12912-16



Stand-up Target Assembly

p/n B-11696-6



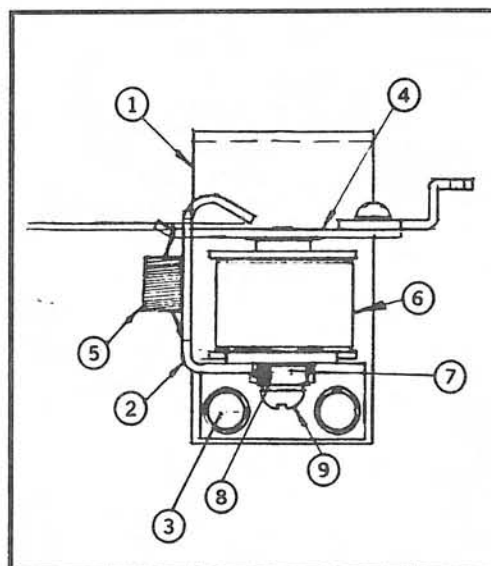
Ball Gate Actuator (Top Lanes Gate)

p/n B-12847

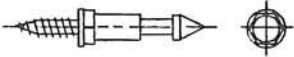
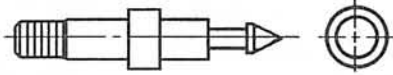
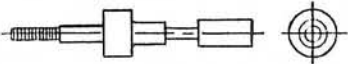
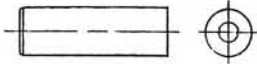
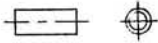
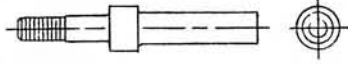
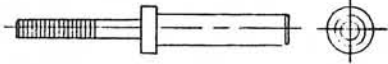
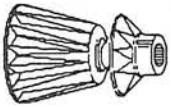
Item	Part No.	Description
1	01-9224	Gate Coil Mtg. Brkt.
2	A-12958	Frame & Eyelet
3	4006-01048-05	MS 6-32 x 5/16 SL-HWH
4	A-11146	Ball Gate Armature Assy.
5	10-120	Compression Spring
6	SM2-35-4000-DC	Coil Assembly
7	4700-00089-00	.172 x 7/16 Flat Washer
8	4701-00003-00	#8 Split Lock Washer
9	4008-01021-07	#8-32 x 7/16 Mach. Screw

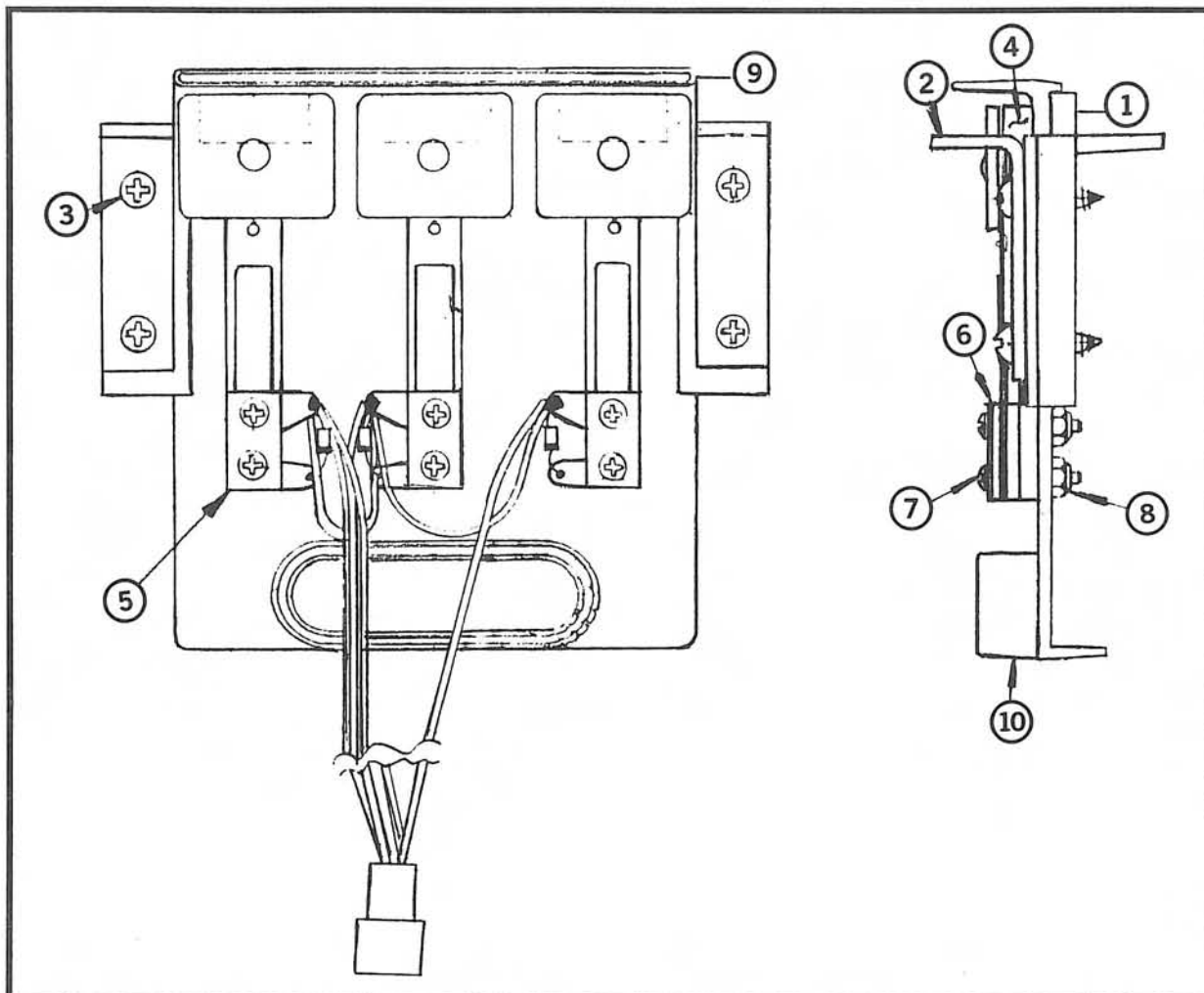
Associated Parts:

1	A-12844	Coil Op. Gate
a)	01-9222	Gate Bracket
b)	10-194	Extension Spring
c)	12-6851	One Way Gate Wire



Playfield Posts

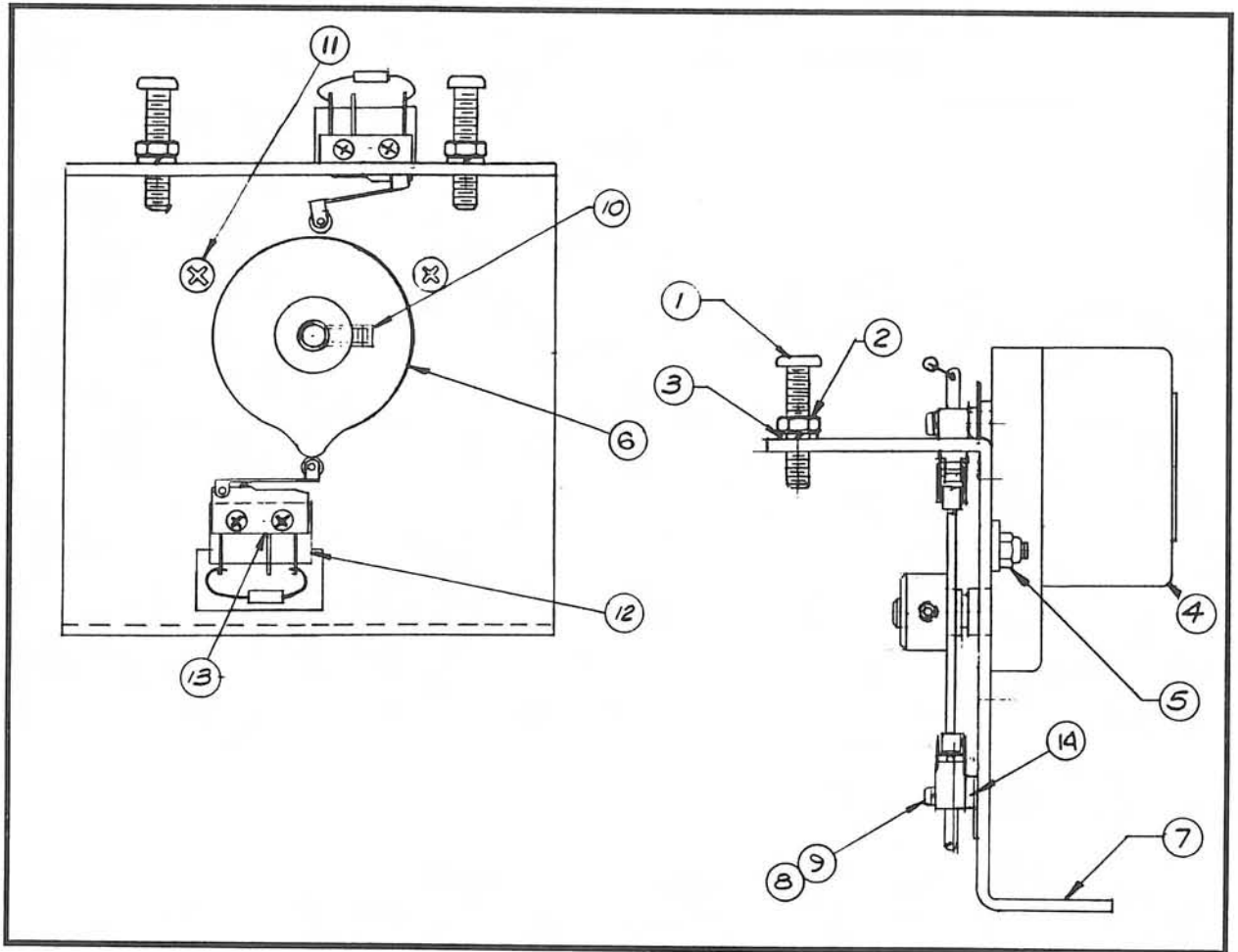
	
02-3905	02-4003
	
02-4008	02-4014
	
02-4020	02-4036
	
02-4057	03-7542-13



Moving Target Assembly

p/n C-12464-1

Item	Part No.	Description
1	03-8028	Retainer Carrier
2	01-8494	Support Bracket
3	4106-01001-10	Mach. Screw #6 x 5/8 P-PH-A
4	23-6534-9	Edge Protector
5	B-12725-1	Switch & Cable Assembly
6	01-3670-1	Switch Plate-Flat
7	4004-01003-12	Mach. Screw 4-40 x 3/4 P-PH-S
8	4404-01119-00	Nut 4-40
9	17-1102	Target Guide, Mod.
10	03-8236	Carrier Target



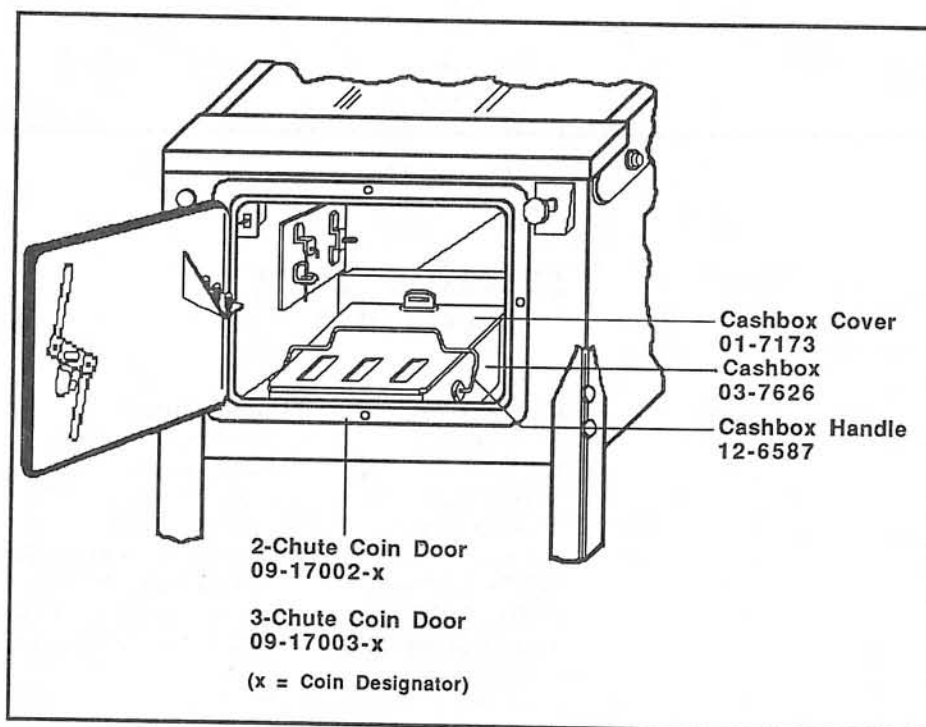
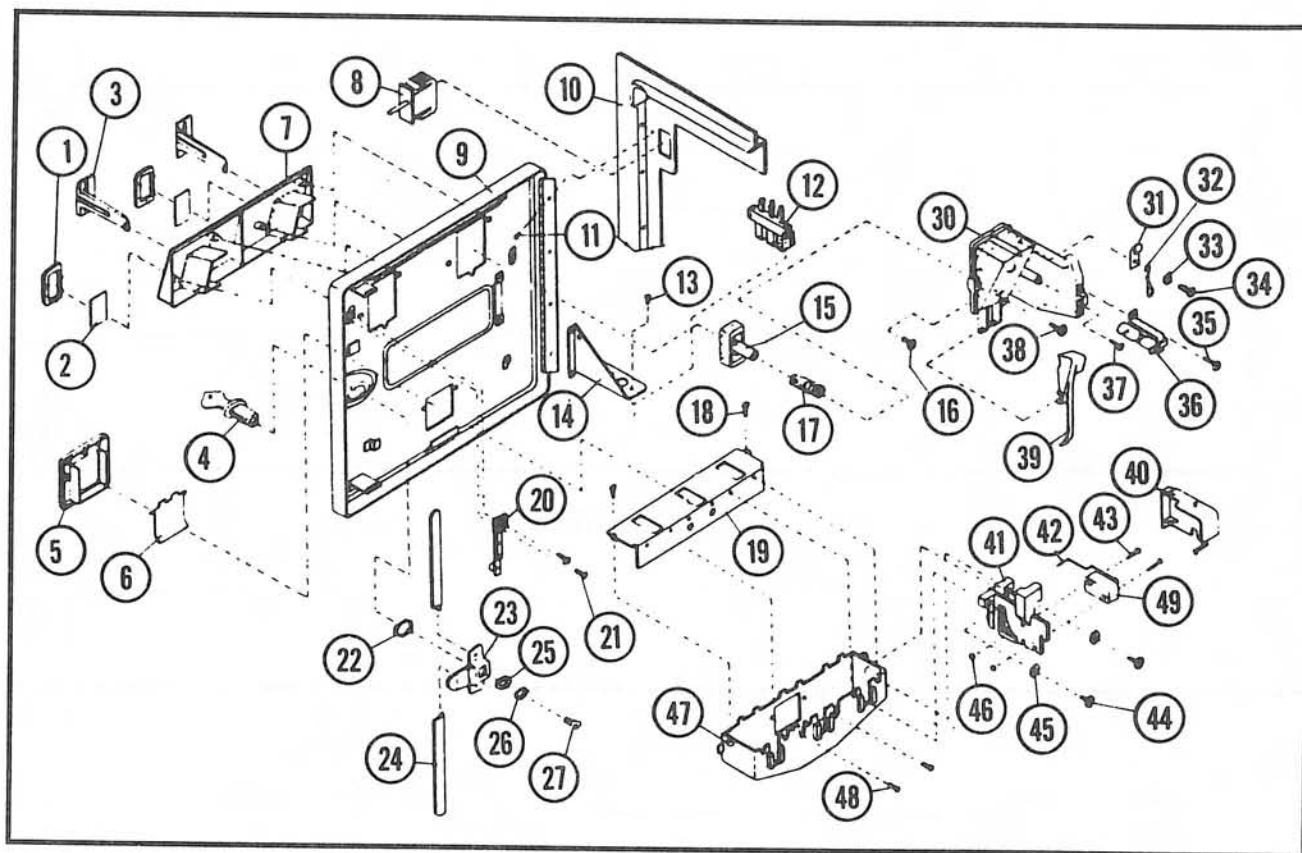
Motor Assembly

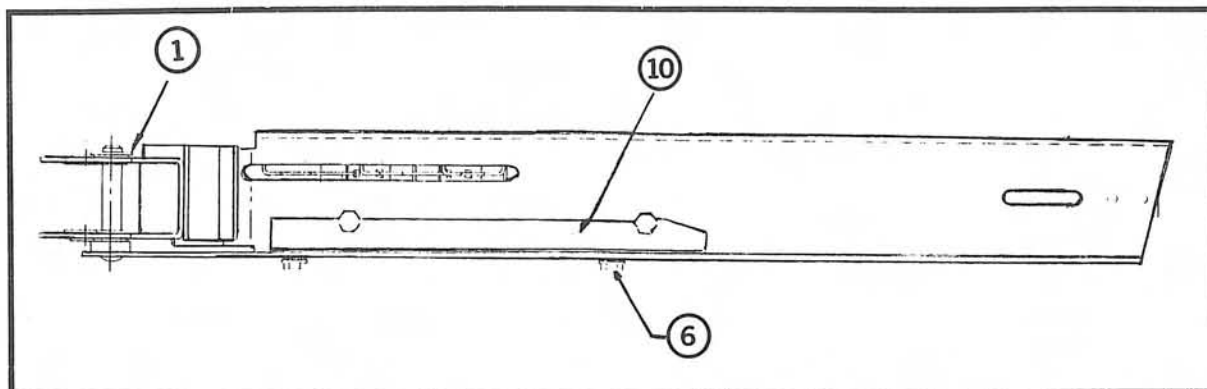
p/n B-13095

Item	Part No.	Description
1	4008-01005-16	Mach. Screw #8-32 x 1 P-PH
2	4408-01117-00	Hex Nut #8-32
3	4701-00003-00	Split Lock Washer #8
4	B-11571-3	Motor Sub-assembly
5	4406-01119-00	Nut #6-32
6	A-13237	Motor Cam
7	01-9367	Motor Mounting Bracket
8	4002-01005-08	Mach. Screw #2-56 x 1/2 P-PH
9	4701-00024-00	Split Lock Washer #2
10	4008-01076-06	Set Screw #8-32 x 3/8 C.P.
11	4006-01041-06	Mach. Screw #6-32 x 3/8 P-FI-H
12	01-8600	Switch Insulator
13	A-12953	Sub-mini Switch Assembly
14	03-8267	Ball Gate Spacer

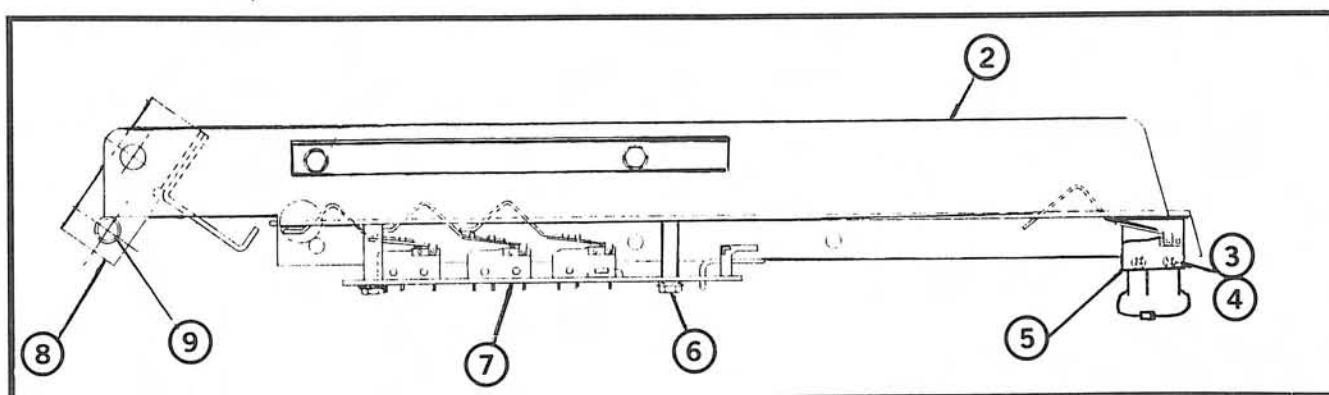
COIN DOOR ASSEMBLY
USA Door with decals, p/n C-13155-1
 2-Chute Door - **09-17002-x**
 3-Chute Door - **09-17003-x**
 ("x" is the country designator)

Item	Part Number	Description	Quantity
1	27-1038	Button Cover	2 or 3
2	27-1041-1-54	Price Panel	2 or 3
3	27-1026-1-15	Coin Entry Plate	2 or 3
4	27-1016	Lock Assembly	1
5	27-1061-1	Coin Return - Bezel	1
6	27-1062	Coin Return Flap	1
7	27-1021	Button Housing - 2-slot	1
	27-1022	Button Housing - 3-slot	1
8	27-1111	Interlock Switch	1
9	27-1006-1	Coin Door , 2-Slot	1
	27-1007-1	Coin Door , 3-Slot	1
10	27-1005	Coin Door Frame	1
11	27-1003	M/C Screw, 6-32 x 3/16	4
12	27-1008	Diagnostic Switch	1
13	27-1101	M/C Screw, 4-40 x 1/4	2
14	27-1102	Bracket, Diagnostic Switch	1
15	27-1037	Button	2 or 3
16	27-1078	M/C Screw, 6-32 x 3/8	2 or 3
17	27-1039	Conical Spring	2 or 3
18	27-1079	Self-tapping Screw, #6 x 1/4	2
19	27-1077-1	Coinbox Cover	1
20	27-1066	Slam Switch	1
21	27-1067	M/C Screw, 4-40 x 1/2	2
22	27-1017	Nut (key)	1
23	27-1012	Locking Cam	1
24	27-1011	Locking Arm	2
25	27-1020	Washer	1
26	27-1018	Star Washer	1
27	27-1019	M/C Screw	1
30	27-1112	Coin Inlet Chute	2 or 3
31	27-1088	Wire Clamp	2 or 3
32	27-1025	Key Hook	2 or 3
33	27-1086	Washer, #6	2 or 3
34	27-1078	M/C Screw, 6-32 x 3/8	2 or 3
	27-1078	M/C Screw, 6-32 x 7/8	2 or 3
35	27-1079	Self-tapping Screw, #6 x 1/4	2 or 3
36	27-1084	Lamp Socket	2 or 3
	27-1085	Lamp	2 or 3
37	27-1096	Self-tapping Screw, #5 x 3/8	2 or 3
38	27-1087	M/C Screw, 6-32 x 5/8	2 or 3
39	27-1082	Lever Arm	2 or 3
40	27-1097	Switch Cover	2 or 3
41	27-1091-1	Coin Accept Chute	2 or 3
42	27-1075	Wire Form	2 or 3
	27-1093	Wire Form	2 or 3
43	27-1094	M/C Screw, 6-40 x 7/8	2
44	27-1087	M/C Screw, 6-32 x 5/8	2
45	27-1086	Washer, #6	2
46	27-1095	Nut, 4-40	2
47	27-1076-1	Coin Return Box	1
48	27-1078	M/C Screw, 6-32 x 3/8	2
49	27-1092	Microswitch	2 or 3





Top View

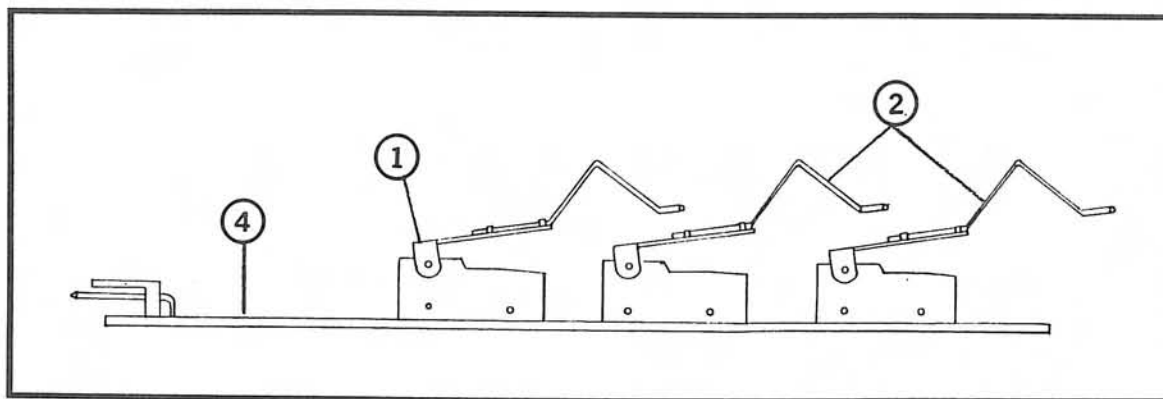


Front View

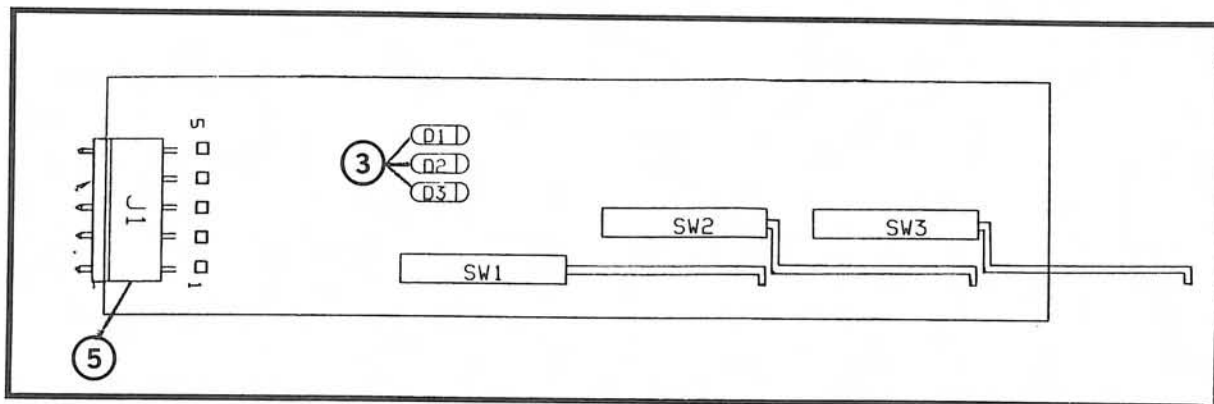
Transfer Tray

p/n C-12923

Item	Part No.	Description
1	20-8712-25	"E" Ring
2	B-12954	Ball Transfer Tray
3	4701-00024-00	Lock Washer #2 Split
4	4002-01005-06	Mach. Screw #2-56 x 3/8 P-PH
5	A-11991	Sub-mini Switch Assembly
a)	5647-12073-01	Micro Switch
b)	5070-06258-00	Diode, 1N4001. 1.0A
6	4006-01048-05	Mach. Screw #6-32 x 3/8
7	C-13061	3 Switch PCB
8	A-13080	Ball Tray Assembly
9	20-8790	Nylined Bearing
10	01-9365	Ball Retainer Bracket



Top View

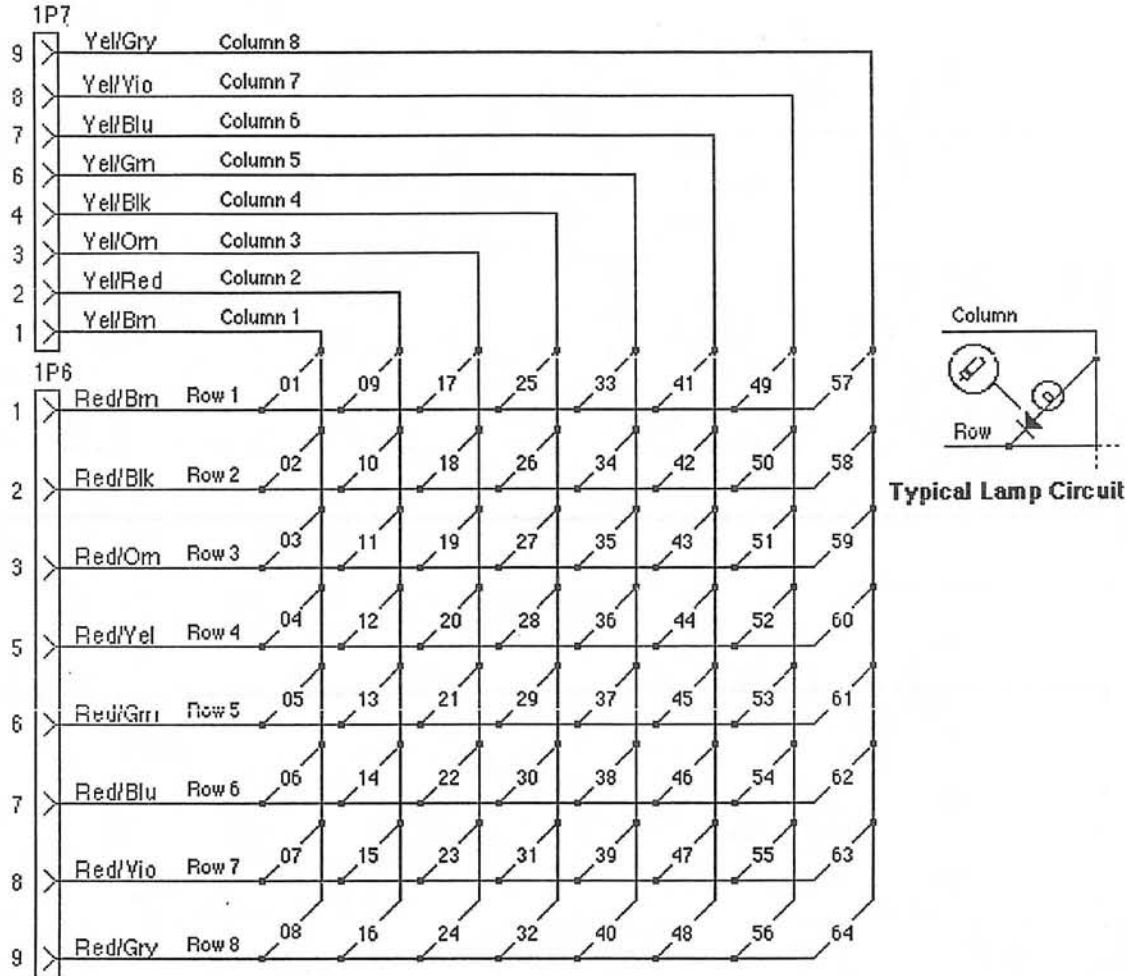


Front View

3 Switch Backboard PCB Assembly p/n C-13061

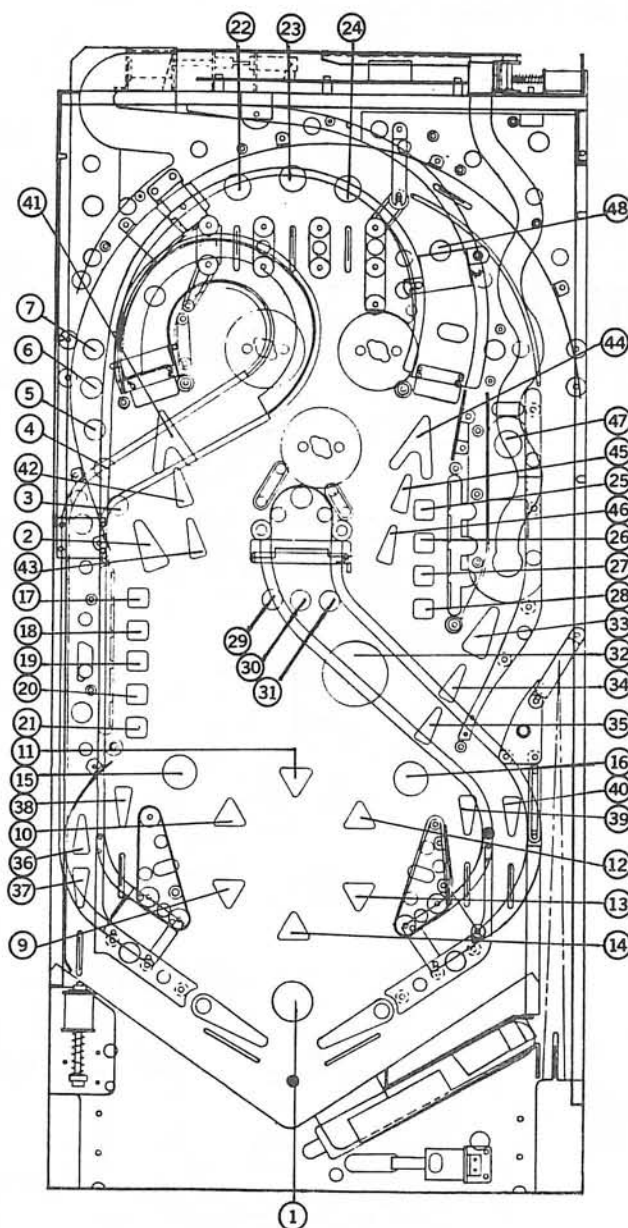
Item	Part No.	Description
1	5647-12073-22	Sub-mini Micro Switch (Sw. 1)
2	5647-12073-23	Sub-mini Micro Switch (Sw. 2 & 3)
3	5070-09954-00	Diode, 1N4004, 1.0 A
4	5768-12517-00	3 Switch PCB
5	5791-10869-05	Header, 5-pin, sq. posts, Right Angle

MOUSIN' AROUND LAMP MATRIX



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
1 Q80 RED-BRN 1J6-1	Shoot Again 1	C 9	M 17	T 25	Set Trap 1 33	Qualify Million 1 41	N 49	Jackpot 1 Million 57
2 Q81 RED-BLK 1J6-2	Set Trap 2 2	H 10	O 18	R 26	Playfield Multiply 34	Extra Ball 1 42	O 50	Jackpot 1.5 Million 58
3 Q82 RED-ORN 1J6-3	50 K 3	E 11	U 19	A 27	Spot Cheese 3 35	Spot Cheese 1 43	I 51	Jackpot 2 Million 59
4 Q83 RED-YEL 1J6-5	100 K 4	E 12	S 20	P 28	Kickback 36	Qualify Million 2 44	L 52	Jackpot 2.5 Million 60
5 Q84 RED-GRN 1J6-6	150 K 5	S 13	E 21	Left Center Target 29	Left Outlane 37	Extra Ball 2 45	L 53	Jackpot 3 Million 61
6 Q85 RED-BLU 1J6-7	200 K 6	E 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Spot Cheese 2 46	I 54	Jackpot 4 Million 62
7 Q86 RED-VIO 1J6-8	250 K 7	2X Bonus 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Right Stand-up Target 47	M 55	Jackpot 5 Million 63
8 Q87 RED-GRY 1J6-9	Jackpot 8	3X Bonus 16	Top Lanes Right 24	Double Play Value Timer 32	Right Outlane 40	Cheezy Bonus 48	Build Jackpot 56	Not Used 64

PLAYFIELD LAMP LOCATIONS

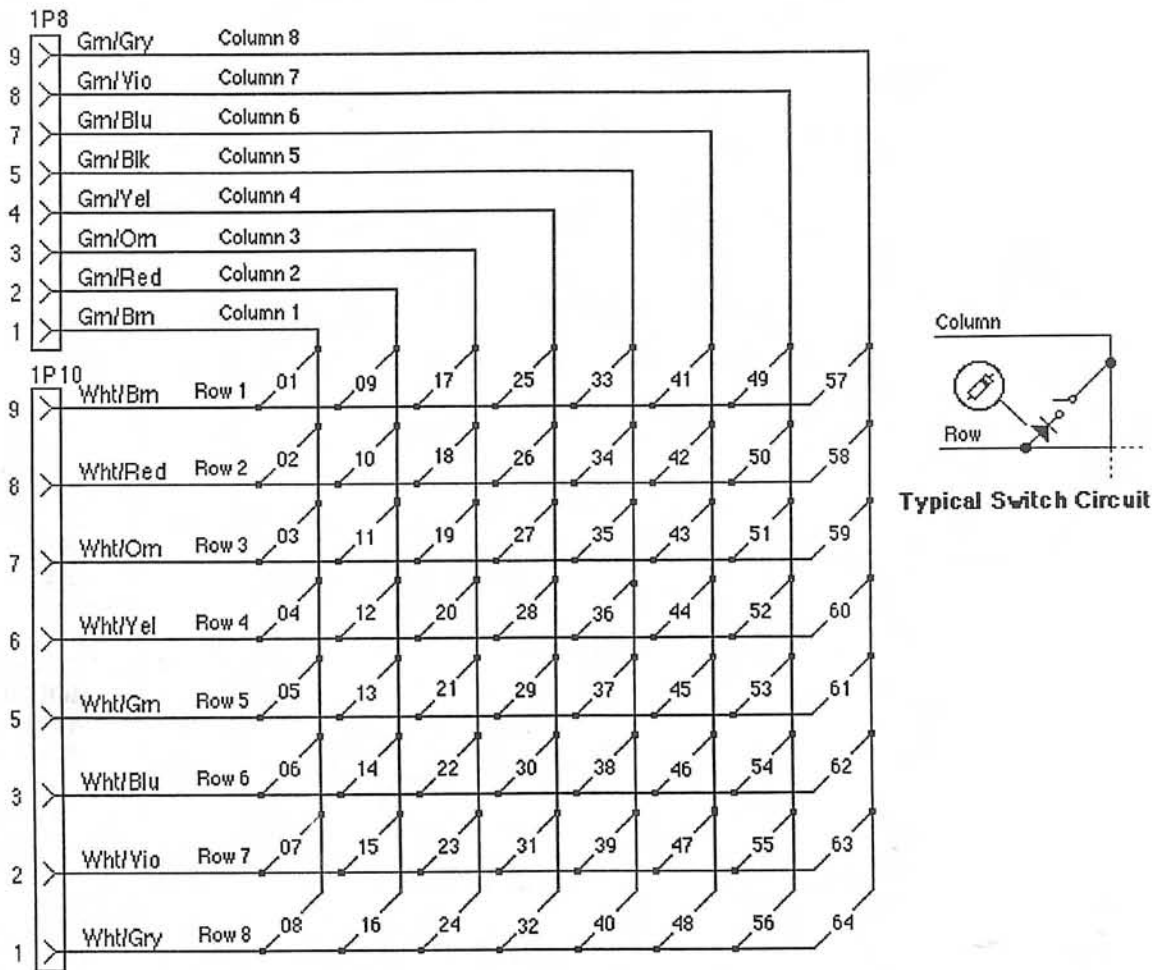


- 47 Right Stand-up
- 48 Cheezy Bonus

NOTE: #49-#56, Are on the Back Panel
 #57-#63, Are on the Insert Board
 #64, Is Not Used

Lamp	Description
1	Shoot Again
2	Set Trap 2
3	50K
4	100K
5	150K
6	200K
7	250K
8	Jackpot
9	C (IN "CHEESE")
10	H (IN "CHEESE")
11	E (IN "CHEESE")
12	E (IN "CHEESE")
13	S (IN "CHEESE")
14	E (IN "CHEESE")
15	2X Bonus
16	3X Bonus
17	M (IN "MOUSE")
18	O (IN "MOUSE")
19	U (IN "MOUSE")
20	S (IN "MOUSE")
21	E (IN "MOUSE")
22	Top Lanes Left
23	Top Lanes Middle
24	Top Lanes Right
25	T (IN "TRAP")
26	R (IN "TRAP")
27	A (IN "TRAP")
28	P (IN "TRAP")
29	Left Center Target
30	Middle Center Target
31	Right Center Target
32	Timer
33	Set Trap 1
34	Playfield Multiply
35	Spot Cheese 3
36	Kickback
37	Left Outlane
38	Left Return Lane
39	Right Return Lane
40	Right Outlane
41	Qualify Million 1
42	Extra Ball 1
43	Spot Cheese 1
44	Qualify Million 2
45	Extra Ball 2
46	Spot Cheese 2

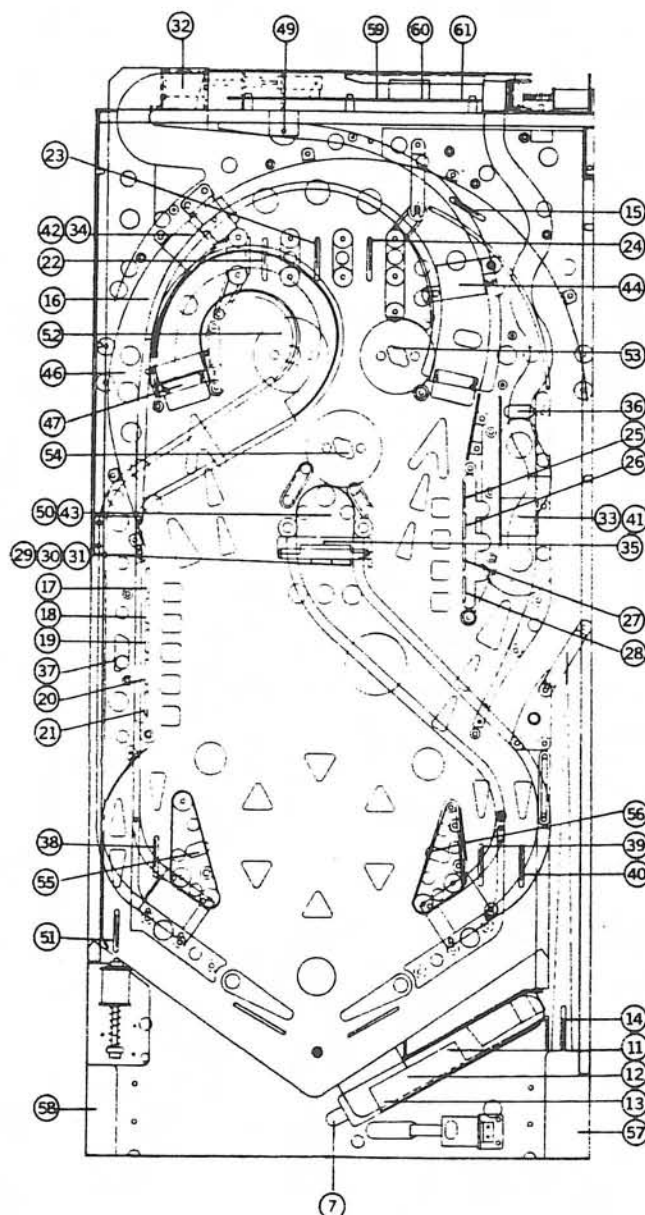
MOUSIN' AROUND SWITCH MATRIX



column	1 Q45	2 Q49	3 Q44	4 Q48	5 Q43	6 Q47	7 Q42	8 Q46	
row	GRN-BRN IJS-1	GRN-RED IJS-2	GRN-ORN IJS-3	GRN-YEL IJS-4	GRN-BLK IJS-5	GRN-BLU IJS-7	GRN-VIO IJS-8	GRN-GRY IJS-9	
1	WHT-BRN IJS-9	Plumb Bob Tilt 1	Outhole 9	M 17	T 25	Trap 1 Up/Down 33	Trap 1 Ball 41	Ball Diverter 49	Right Flipper 57
2	WHT-RED IJS-8	Not Used 2	Not Used 10	O 18	R 26	Trap 2 Up/Down 34	Trap 2 Ball 42	Motor Bank Down 50	Left Flipper 58
3	WHT-ORN IJS-7	Credit Button 3	Trough 1 Right 11	U 19	A 27	Center Ramp 35	Motor Bank Up 43	Left Outlane 51	Mouse Hole Lock 1 59
4	WHT-YEL IJS-6	Right Coin Chute 4	Trough 2 Middle 12	S 20	P 28	Playfield Multiply 36	Right Ramp Enter 44	Left Jet 52	Mouse Hole Lock 2 60
5	WHT-GRN IJS-5	Center Coin Chute 5	Trough 3 Left 13	E 21	Left Center Target 29	Left Ramp Exit 37	Not Used 45	Right Jet 53	Mouse Hole Lock 3 61
6	WHT-BLU IJS-3	Left Coin Chute 6	Shooter Lane 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Right Ramp Exit 46	Bottom Jet 54	Not Used 62
7	WHT-VIO IJS-2	Slam Tilt 7	Right Return Loop 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Left Ramp Enter 47	Left Sling 55	Not Used 63
8	WHT-GRY IJS-1	High Score Rset 8	Left Return Loop 16	Top Lanes Right 24	Mouse Hole Enter 32	Right Outlane 40	Not Used 48	Right Sling 56	Not Used 64

SWITCHES

Item	Part No.	Description
1	20-6502-A	Plumb Bob Tilt
2		Not Used
3	SW-1A-126	Credit Button
4	27-1092	Right Coin Sw.
5	Not Used	Center Coin Sw.
6	27-1092	Left Coin Sw.
7	27-1066	Slam Tilt
8	27-1008	High Score Reset
9	A-10417	Outhole
10		Not Used
11	5647-12073-00	Trough 1, Right
12	5647-09957-00	Trough 2, Middle
13	5647-09957-00	Trough 3, Left
14	5647-12073-04	Shooter Lane
15	A-12866	RT. Ret. Lane Loop
16	5647-12133-04	LT. Ret. Lane Loop
17	B-12912-16	M (in Mouse)
18	B-12912-16	O (in Mouse)
19	B-12912-16	U (in Mouse)
20	B-12912-16	S (in Mouse)
21	B-12912-16	E (in Mouse)
22	5647-12073-19	Top Lanes Left
23	5647-12073-19	Top Lanes Mid.
24	5647-12073-19	Top Lanes Rt.
25	B-12912-16	T (in Trap)
26	B-12912-16	R (in Trap)
27	B-12912-16	A (in Trap)
28	B-12912-16	P (in Trap)
29	A-11177-1	Left Center Tgt.
30	A-11315-3	Mid. Center Tgt.
31	A-11315-3	Rt. Center Tgt.
32	A-11991	Mouse Hole Enter
33	p/o B-20-9629	Trap 1 Up/Down
34	p/o B-20-9629	Trap 2 Up/Down
35	5647-12073-31	Center Ramp
36	B-11696-6	Playfield Multiply
37	A-12238	Left Ramp Exit
38	A-12688	Left Return Lane
39	A-12688	Right Return Lane
40	A-12688	Right Outlane
41	p/o B-20-9629	Trap 1 Ball
42	p/o B-20-9629	Trap 2 Ball
43	5647-12073-06	Motor Up
44	A-12238	Right Ramp Enter
45		Not Used
46	5647-12133-04	Right Ramp Exit
47	A-12238	Left Ramp Enter
48		Not Used
49	A-12953	Ball Diverter
50	5647-12073-06	Motor Down
51	5647-12073-19	Left Outlane
52	SW-11A-37	Left Jet
53	SW-11A-37	Right Jet
54	SW-11A-37	Bottom Jet



55	SW-1A-114	Left Sling (kicker)
55a	SW-1A-120	Left Sling (score)
56	SW-1A-114	Right Sling (kicker)
56a	SW-1A-120	Right Sling (score)
57	03-7811	Right Flipper
58	03-7811	Left Flipper
59	p/o C-13061	Mouse Hole Lock 1
60	p/o C-13061	Mouse Hole Lock 2
61	p/o C-13061	Mouse Hole Lock 3
62-64		Not Used

Note: Each Ball Eater has two switches. The center is #41 & #42 and tells the CPU if a ball is in the Ball Eater. The switch to the back and side is #33 & #34 and tells the CPU if the Ball Eater is up or down. The Motorized Target also has two switches. The right side switch tells the CPU the target is down, the left side switch tells the CPU the target is up.

MOUSIN' AROUND Solenoid Table

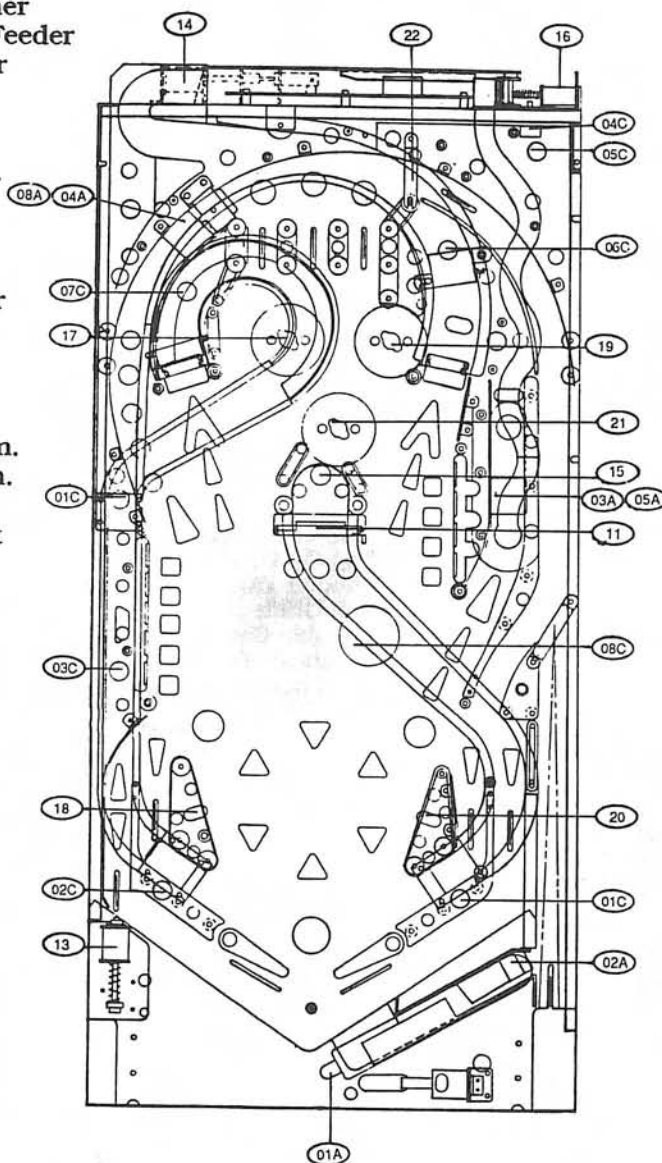
Sol. No.	Function	Solenoid Type	Wire Color	Connections		Driver Trns	Solenoid Part Number Flashlamp Type d= Display Bd; p=Playfield	
				CPU Bd	Playfield/ Cabinet			
01A 3	Outhole Kicker	Switched	Vio-Brn	1P11-1	5J1-9: 5J4-9 (A)	Q33	AE-23-800	
01C 3	Right Flipper Flasher	Switched	Blk-Brn	(Gry-Brn)	5J5-9 (C)	Q33	#89 flashlamps	2p
02A 3	Ball Shooter Lane Feeder	Switched	Vio-Red	1P11-3	5J1-7: 5J4-8 (A)	Q25	AE-23-800	
02C 3	Left Flipper Flasher	Switched	Blk-Red	(Gry-Red)	5J5-8 (C)	Q25	#89 flashlamps	2p
03A 3	Trap 1 Up	Switched	Vio-Orn	1P11-4	5J1-6: 5J4-7 (A)	Q32	AE-26-1400	
03C 3	Left Side Flasher	Switched	Blk-Orn	(Gry-Orn)	5J5-7(C)	Q32	#89 flashlamps	1p
04A 3	Trap 2 Up	Switched	Vio- Yel	1P11-5	5J1-5: 5J4-6 (A)	Q24	AE-26-1400	
04C 3	Back Panel Flasher	Switched	Blk-Yel	(Gry-Yel)	5J5-5 (C)	Q24	#906 flashlamp	1b
05A 3	Trap 1 Down	Switched	Vio-Grn	1P11-6	5J1-4: 5J4-5 (A)	Q31	SM1-28-800	
05C 3	Top Right Flasher	Switched	Blk-Grn	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamp	1p
06A 3	Not Used	Switched	Vio-Blu	1P11-7	5J1-3: 5J4-4 (A)	Q23		
06C 3	Right Ramp Flasher	Switched	Blk-Blu	(Gry-Blu)	5J5-3 (C)	Q23	#89 flashlamp	1p
07A 3	Knocker	Switched	Vio-Blk	1P11-8	5J1-2: 5J4-2 (A)	Q30	AE-23-800	
07C 3	Left Ramp Flashers	Switched	Blk-Vio	(Gry-Vio)	5J5-2 (C)	Q30	#89 flashlamp	1p
08A 3	Trap 2 Down	Switched	Vio-Gry	1P11-9	5J1-1: 5J4-1 (A)	Q22	SM1-28-800	
08C 3	Timer Flasher	Switched	Blk-Gry	(Gry-Blk)	5J5-1 (C)	Q22	#89 flashlamps	2p
09	Insert Board Gnl Illum Relay	Controlled	Brn-Blk	1P12-1	5J2-9: 5J6-9: 2J4-3	Q17	5580-09555-01	4a
10	Playfield Gnl Illum Relay	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-09555-01	4a
11	Motor Relay	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	5580-12145-01	4b
12	A/C Select	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01	5
13	Kickback (L Outlane)	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	AE-24-900	
14	Ball Diverter	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	AE-23-800	
15	Center Flashers	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	#89 flashlamps	1p
16	Mouse Hole Exdt	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-26-1200	
17	Left Jet Bumper							
18	Left Kicker ("sling")	Special #1	Blu-Brn	1P19-7	5J3-7: 5J7-7	Q75	AE-23-800	
19	Right Jet Bumper	Special #2	Blu-Red	1P19-4	5J3-6: 5J7-6	Q71	AE-26-1500	
20	Right Kicker ("sling")	Special #3	Blu-Orn	1P19-3	5J3-3: 5J7-3	Q73	AE-23-800	
21	Lower Jet Bumper	Special #4	Blu-Yel	1P19-6	5J3-4: 5J7-5	Q69	AE-26-1500	
22	Top Lanes Gate	Special #5	Blu-Grn	1P19-8	5J3-2: 5J7-2	Q77	AE-23-800	
-	Right Flipper	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	SM2-35-4000	
-	Lower Right Flipper	-	Orn-Vio [Blu-Vio]	2 1P19-1	2J5-5: 2J10-7 [2J10-1: 2J8-15]	-	FL11630/50VDC	
-	Left Flipper	-	Orn-Gry [Blu-Gry]	2 1P19-2	2J5-4: 2J10-8 [2J10-2: 2J8-4]	-	FL11630/50VDC	

Notes 1. Wire colors, except flipper Orn- Vio and Orn-Gry are ground connections (to 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 coll. 3. "A" circuits are pulsed, when Sol. 12 is de-energized; "C" circuits are pulsed, with Sol. 12 energized. Wire colors in brackets are those from respective A and C terminals corresponding to the J1-terminal connection listed for the Aux Power Driver Bd. which controls the device pulsing by Sol. 12. 4. Relay is mounted on Relay bd. (4a) C-11998-1; (4b) C-11902-1. 5. Relay mounted on Aux. Power Driver Bd., D-12247.

SOLENOID/FLASHERS

Item	Part #	Description
01A	AE-23-800	Outhole
01C	#89 Flashlamp	Right Flipper Flasher
02A	AE-23-800	Ball Shooter Lane Feeder
02C	#89 Flashlamp	Left Flipper Flasher
03A	AE-26-1400	Trap 1 Up
03C	#89 Flashlamp	Left side Flasher
04A	AE-26-1400	Trap 2 Up
04C	#906 Flashlamp	Back Panel Flasher
05A	SM1-28-800	Trap 1 Down
05C	#89 Flashlamp	Top Right Flasher
06A		Not Used
06C	#89 Flashlamp	Right Ramp Flasher
07A	AE-23-800	Knocker
07C	#89 Flashlamps	Left Ramp Flashers
08A	SM1-28-800	Trap 2 Down
08C	#89 Flashlamp	Timer Flashers
09	5580-09555-01	Insert Bd. Gen. Illum.
10	5580-09555-01	Playfield Gen. Illum.
11	5580-12145-01	Motor Relay
12	5580-09555-01	Solenoid A/C Select
13	AE-24-900	Kickback
14	AE-23-800	Ball Diverter
15	#89 Flashlamp	Center Flashers
16	AE-26-1200	Mouse Hole Exit
17	AE-23-800	Left Jet Bumper
18	AE-23-1500	Left Kicker (sling)
19	AE-23-800	Right Jet Bumper
20	AE-26-1500	Right Kicker (sling)
21	AE-23-800	Lower Jet Bumper
22	SM2-35-4000	Top Lanes Gate
	FI 11630/50VDC	Left and Right Flippers

Note: Solenoid #16 is on the Back Panel.



PLAYFIELD PARTS

MAJOR ASSEMBLIES

Item	Part No.	Description
1	12-6871	Anti-rebound Wire
2	31-1008-2009	Bottom Arch Fence
a)	01-9366-2	Extension
3	C-11626-L-3	Left Flipper Assembly
4	B-11873-1	Left Outlane Kickback
5	B-12852	Left Lane Guide Assembly
6	B-12665	Kicker Assembly
7	11-911-A	Wood Rail
8	B-12850	Left Exit Ball Guide Assy.
9	B-12912-16	Stand-up Target Assembly
10	D-12830	Left Side Ramp Assembly
11	C-12464-1	Moving Target Assembly
a)	B-13095	Motor Assembly
12	B-9414-2	Jet Bumper Assembly
13	01-9214-1	Ramp Enter Plate
14	B-20-9629	Trap (Ball Eater)
15	A-8244-L	Ball Gate Assembly
16	R-12829	Multi-ramp Network Assembly
17	C-12902-1	Ball Deflector (Diverter) Assembly
18	B-13081	Drop Kick Mech.
19	B-12847	Ball Gate Actuator
a)	A-12844	Coil Op Gate Assembly
20	D-12848	Shooter Lane Scoop Assembly
21	12-6855	Ball Guide
22	A-13114	Entrance Gate Assembly
23	B-11696-6	Stand-up Target Assembly
24	A-12849	Multi-ramp Scoop Assembly
25	12-6854	Ball Guide
26	B-20-9629	Trap (Ball Eater)
27	B-12912-16	Stand-up Target Assembly
28	B-12853	Shooter Lane Ball Guide Assembly
29	A-11760-1	Ball Shooter Gate Assembly
30	A-12855	Lower Shooter Lane Ball Guide
31	11-911-B	Wood Rail
32	C-13026	Center Ramp Assembly
33	A-12856	Flipper Feed Ball Guide Assembly
34	B-12665	Kicker Assembly
36	11-911-C	Wood Rail
36	A-12851	Right Ball Guide Assembly
37	C-9638-1	Ball Shooter Lane Feeder
a)	B-9362-L-1	Coil & Bracket Assembly
38	A-11619	Shooter Lane Switch Assembly
39	C-11626-R-3	Right Flipper Assembly
40	B-8039-2	Outhole Kicker Assembly
41	12-6864	Ball Guide
42	02-4003	Post

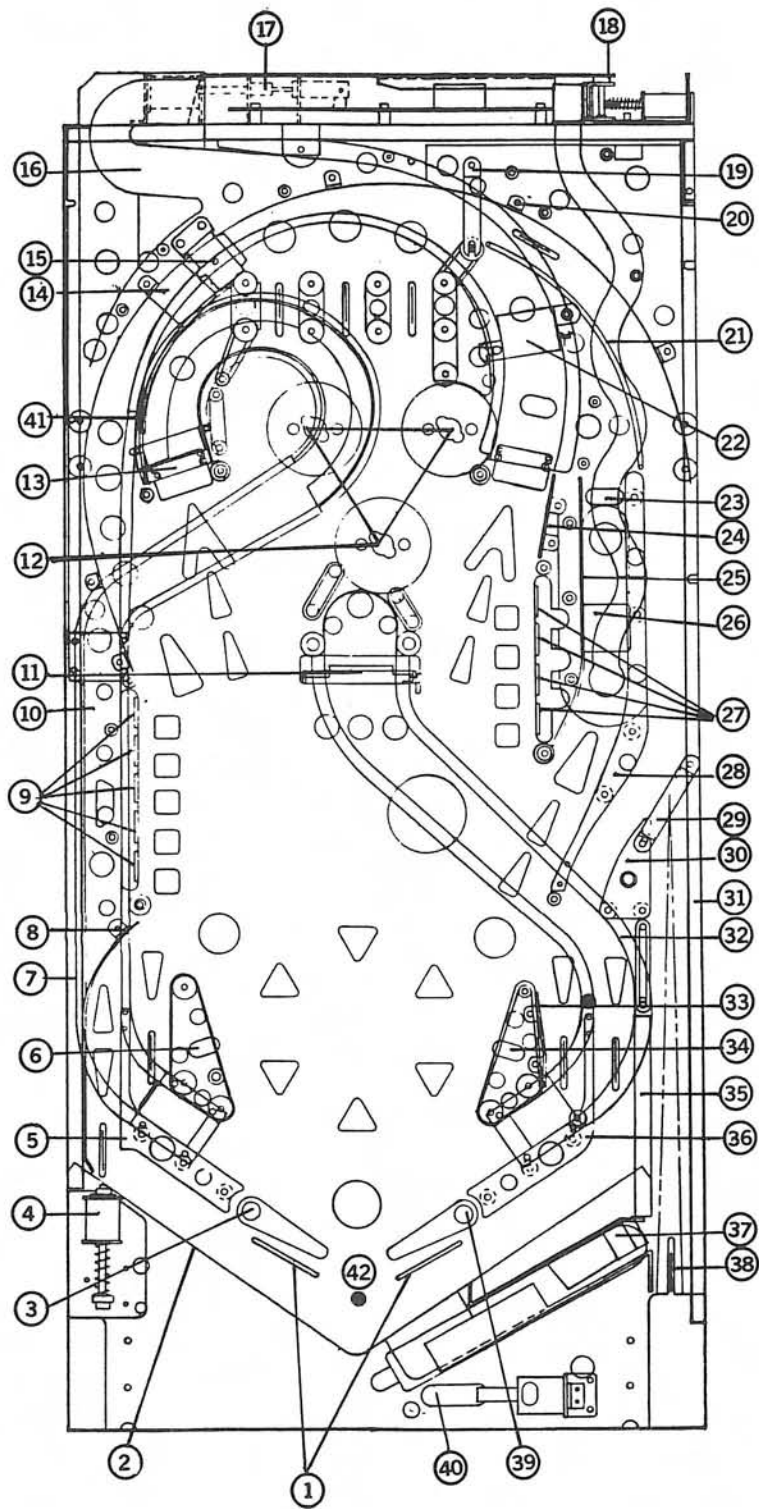
RUBBER PARTS

Item	Part No.	Description
1	23-6300	Rubber Ring 5/16"
2	23-6302	Rubber Ring 1"
3	23-6303	Rubber Ring 1 1/4"
4	23-6306	Rubber Ring 2 1/2"
5	23-6420	Rubber Grommet
6	23-6519-4	Red Rubber Ring
7	23-6534	Glass Protector
8	23-6534-9	Edge Protector
9	23-6552	Rubber Bumper
		Sleeve-Yellow
10	23-6556	Rubber Bumper
		Sleeve-Black
11	23-6577	Plug Bumper
12	23-6626	Rubber Grommet

PARTS UNDER BOTTOM ARCH

Part No.	Description
B-8925	Trough Switch PLate
B-8623	Upper Trough Baffle Assembly
01-5575	Bottom Arch Mtg. Bracket
C-8235	Lower Trough Baffle Assembly
12-6542	Baffle Wireform
01-3569-1	Ball Trough
B-12445-1	Shooter Assembly

PLAYFIELD PART LOCATIONS



Center Ramp p/n C-13026

Part No.	Description
01-9344-1-L	U Shaped Switch Mounting Bracket
03-8316	Plastic Ramp
12-6872-1	Actuator Wire
4701-00024-00	LW #2 Split
4002-01005-06	Mach. Screw 2-56 x 3/8 P-PH
07-6688-18N	1/8 Dia. x 3/16 L
01-9221	Retainer Plate
01-9220	Ball Stop Bracket
A-13238	Switch & Diode Assembly
H-13141	Center Ramp Cable
4008-01015-08B	MS 8-32 x 1/2 P-PH TT
5070-06258-00	Diode, 1N4001, 1.0A

Left Side Ramp p/n D-12830

Part No.	Description
A-12239	Sub-mini Switch Assembly
a) 5647-12073-11	Sub-mini Micro Switch
b) 5070-06258-00	Diode, 1N4001, 1.0A
A-12238	Sub-mini Switch Assembly
a) 5647-12073-13	Sub-mini Switch
b) 5070-06258-00	Diode, 1N4001, 1.0A
01-8774	Switch Bracket
01-9214-1	Ramp Enter Plate
01-9219	Micro Switch Bracket
01-9220	Ball Stop Bracket
01-9221	Retainer Plate
03-8290	Plastic Ramp
A-13288	Ball Gate Assembly
a) 12-6824	Wire
07-6688-17N	Nickel Rivet
07-6688-19N	Rivet
4002-01005-06	Mach Screw 2-56 x 3/8 P-PH
H-13135	Left Ramp Exit Cable
H-13138	Left Ramp Entrance Cable
4700-00003-00	FW .125 x .81 x .032
4701-00024-00	LW #25 Split
4006-01027-06	MS 6-32 x 3/8 P-RWH
4008-01015-08B	MS 8-32 x 1/2 P-PH TT
4406-01128-00	Nut 6-32 Keps

Multi-ramp Network p/n R-12829

Part No.	Description
A-13114	Entrance Gate Assembly
A-12238	Sub-mini Switch Assembly
a) 5647-12073-13	Micro Switch
b) 5070-06258-00	Diode, 1N4001, 1.0A
01-8774	Switch Bracket
01-9214-2	Ramp Enter Plate
01-9217	Ramp Exit Plate
01-9221	Retainer Plate
03-8289	Plastic Ramp
03-7796	Plastic Washer
12-6848	Switch Actuator Wire
4002-01005-06	Mach. Screw 2-56 x 3/8 P-PH
4006-01027-06	Mach. Screw 6-32 x 3/8 P-RWH
4406-01128-00	Nut 6-32 Keps
4700-00003-00	Flat Washer .125 x .281 x .032
4701-00024-00	LW #2 Split
H-13136	Right Ramp Exit Cable
4008-01015-08B	MS 8-32 x 1/2 P-PH TT
12-6848	Wire-Actuator
12-6875	Wire-Gate 2" Entrance

Multi-ramp Scoop p/n A-12849

Part No.	Description
01-9226	Multi-ramp Scoop Enter
01-6811-1	Arch Clip

Vertical Ramp p/n B-13058

Part No.	Description
01-9339-1	Right Ramp Wall
01-9339-2	Left Ramp Wall
01-9340	Ramp Floor

Top 3 Lamp Board p/n-C-12000

Part No.	Description
24-8767	Twist Lamp Socket
24-8768	Bulb #555 (6.3V 2.5A.)
5070-09054-00	Diode, 1N4004, 1.0A
5768-12245-00	Top 3 Lamp PCB
5791-10871-05	Header, 5-pin sq. post

Single Lamp Board p/n B-12224

Part No.	Description
24-8767	Twist Lamp Socket
24-8768	Bulb #555 (6.3 V, 2.5 A)
5070-09054-00	Diode, 1N4004, 1.0 A
5768-12312-00	Single Lamp PCB

5 Lamp Board p/n C-12876

Part No.	Description
24-8767	Twist Lamp Socket
24-8768	Bulb #555 (6.3 V, 2.5 A)
5070-09054-00	Diode, 1N4004, 1.0 A
5768-12453-00	5 Lamp PCB
5791-10871-07	Header, 7-pin sq. post

Playfield Back Stop Lamp Board p/n C-12937

Part No.	Description
24-8767	Twist Lamp Socket
24-8768	Bulb #555 (6.3 V, 2.5 A)
5070-09054-00	Diode, 1N4004, 1.0 A
5768-12460-00	Playfield Back Stop Lamp PCB
5791-10871-11	Header, 11-pin flat posts

4 Lamp Board p/n C-12877

Part No.	Description
24-8767	Twist Lamp Socket
24-8768	Bulb #555 (6.3 V, 2.5 A)
5070-09054-00	Diode, 1N4004, 1.0 A
5768-12452-00	4 Lamp PCB
5791-10871-06	Header, 6-pin sq. post

Single Flashlamp Board p/n B-12156

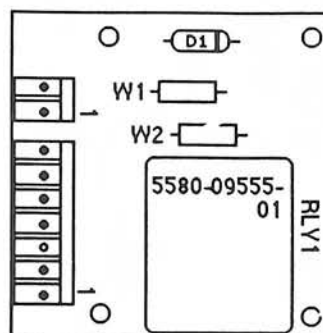
Part No.	Description
24-8803	Single Large PCB Twist
24-8802	Bulb #906, (13V, .69A)
5678-12297-00	Lamp PCB

7 Lamp Insert Board p/n C-13120

Part No.	Description
24-8804	V-Wedge PCB Socket
24-8768	Bulb #555, (6.3V, 2.5A)
5070-09054-00	Diode, 1N4004
5768-12531-00	7 Lamp PCB
5791-10871-09	Header, 9-pin sq. post

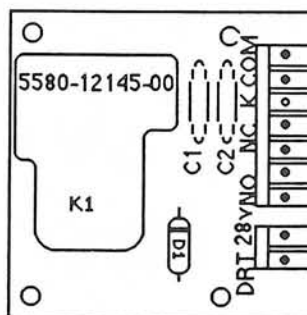
Relay Board p/n C-11998-1

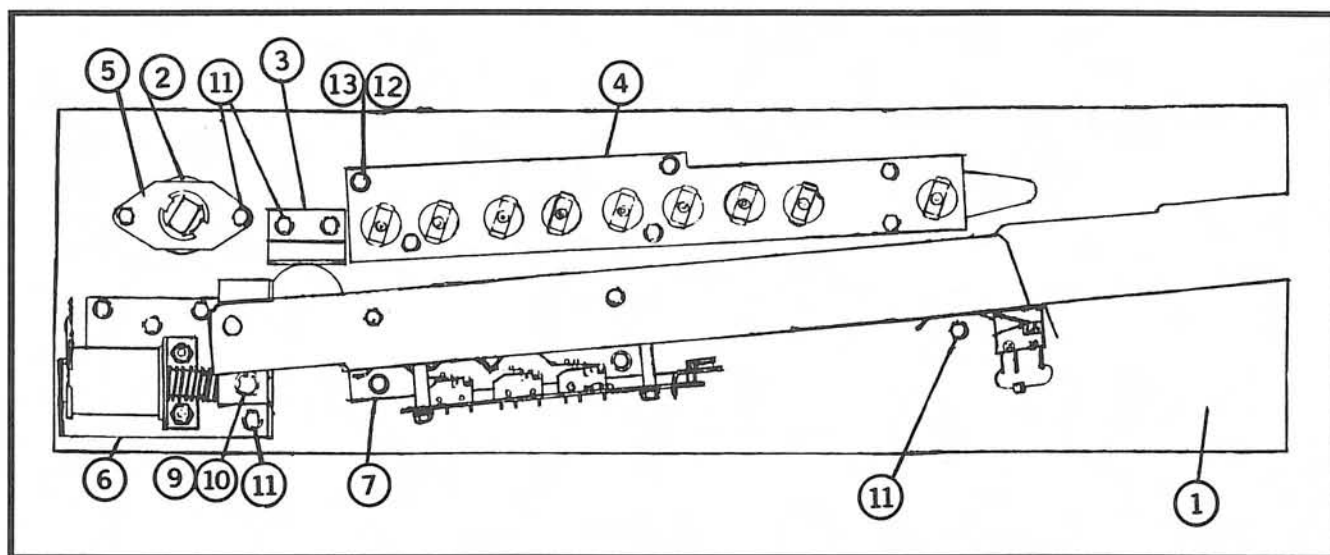
Part No.	Description
5010-09534-00	0 Ω Resistor
5070-09054-00	Diode, 1N4004, 1.0 A
5580-09555-01	Relay, DPDT, 24 V, 13 A
5768-12243-00	DP Mount Relay PCB
5791-12273-02	Header, 2-pin, sq. posts
5791-12273-07	Header, 7-pin, sq. posts



Relay Board p/n C-11092-1

Part No.	Description
5070-09054-00	Diode, 1N4004 1.0A
5580-12145-00	Relay PC, 24V, 30A
5768-12221-00	MT, Relay Brd PC
5791-12273-02	Header, 2-pin, sq. posts
5791-12273-07	Header, 7-pin, sq. posts





Back Panel Assembly

p/n D-12857

Item	Part No.	Description
1	31-1475-2009	Back Panel
2	03-8149-16	Playfield Insert (opto detect)
3	01-9364	Ball Deflector Bracket
4	C-12937	Playfield Back Stop Lamp PCB
5	B-12156	Single Lamp PCB
6	B-13081	Drop Kick Mech. Assembly
7	C-12923	Transfer Tray Assembly
8	02-4402	Ball Tray Drive Pin
9	20-8712-25	1/4 "E" Ring
10	4106-01115-08	SMS #8 x 1/2 PL-HWH
11	4106-01115-12	SMS #8 x 3/4 PL-HWH
12	03-8022-5	Spacer 11/32
Associated Parts:		
	B-12858	Diverter Mech.
	C-12902-1	Ball Deflector (Diverter)

Backbox Parts List

Part No.	Description
D-11581-2009	Audio Board
D-11883-2009	System 11B CPU Board
D-12246	Power Supply Board
D-12313-2009	Backbox Interconnect Board
D-12247-566	Aux. Power Driver
D-12502-1	Lo Master Display
D-12706	Hi Master Display
01-6645-3	Vent Hole Screen 25 1/2
01-6655	Insert Latch
01-6733	Speaker Grille
01-8397	Trunk Latch Bracket
01-8996	Speaker Grille
5040-09051-00	Capacitor, 30,000 μ f, 25V
5100-09418-00	Bridge Rectifier, 100V, 35A
5555-12068-00	Speaker 4" Piezo 50W
5555-12469-00	Speaker 4 Ω Round

Standard Cable List

Part No.	Description
H-8527	Volume Control Cable
H-10978	A.C. Rectifier Cable
H-11037	Sound Interconnect Cable
H-11834	18V Rectifier Cable
H-11835	Knocker Cable
H-12190-2009	Main Backbox Harness
H-12196-553	Secondary Cable
H-12199	Lamp Interconnect Cable
H-12200	Switch Interconnect Cable
H-12299-2008	Logic/Power Speaker Cable
H-12775	Speaker Panel Cable
H-12776	Main Display Cable

Miscellaneous Parts List

Part No.	Description	Part No.	Description
A-8552-2009	Backglass Assembly	2009-IN	Insert Assembly
B-12245-1	Ball Shooter Assembly	20-6500	Steel Ball 1-1/16
C-10843	Metal Leg Assembly	20-9518	Backbox Hinge
C-11026	Line Filter Assembly	24-6549	#44 Bulb
01-6592	Vent Hole Screen	24-8704	#89 Bulb
01-8169	Vent Hole Screen	24-8768	#555 Bulb
01-8992	Hinge Back-up Bracket	24-8802	#906 Bulb
01-9358	Lock & Cam	31-1475-2009	Back Panel Screened
03-7960-2009	Playfield Mylar	31-1002-2009	Screened Playfield
03-8228-1	Glass Edge Channel	31-1006-2009	Plastic Set
03-8229-1	Glass Lift Channel	31-1008-2009	Screened Bottom Arch
08-7028-T	Toggle Latch	31-1009-2009	Screened Shooter Lane
08-7377	Leg Adjuster	31-1357-2009	Screened Backglass

UNIQUE PARTS

Part No.	Description	Part No.	Description
A-12844	Coil Operated Gate Assembly	01-9344-1-L	Left Switch Gate Bracket
A-12849	Multi-ramp Scoop Assembly	01-9349	Drop Kick Mech. Bracket
A-12851	Right Ball Guide Assembly	01-9350	Coil Retaining Bracket
A-12855	Lower Shooter Lane Ball Guide Assembly	01-9351	Ball Tray Bracket
A-12856	Flipper Feed Ball Guide Assembly	01-9352	Ball Tray Pivot Bracket
A-12859	Diverter Housing Assembly	01-9364	Ball Deflector Bracket
A-13027	Side Mount Switch & Bracket	01-9366-2	Bottom Arch Kicker Extension
A-13029	Bobbin Assembly		
A-13080	Ball Tray Bracket Assembly	03-7500-4	Push Button
A-13114	Entrance Gate Assembly	03-7960-2009	Playfield Mylar
A-13117	Playfield Plastic Assembly		
		11-2009	Wood Playfield
B-12850	Left Exit Assembly	11-831-2009	Back Panel
B-12852	Left Lane Guide Assembly	11-911-A	Wood Rail
B-12853	Shooter Lane Ball Guide Assembly	11-911-B	Wood Rail
		11-911-C	Wood Rail
B-12954	Ball Transfer Tray Assembly		
B-13081	Drop Kick Mech. Assembly	12-6851	One Way Gate Wire
B-13095	Motor Bracket Assembly	12-6854	Wire-ball Guide Trap
		12-6855	Wire Shooter Lane Ball Guide
C-12464-1	Moving Target Assembly	12-6864	Left Trap Ball Guide Wire
C-12876	5-Lamp Playfield Assembly	12-6872-1	U-shaped Actuator Wire Guide Bracket
C-12877	4-Lamp Playfield Assembly		
C-12880	Playfield Top 3 Lamps Assembly	16-2009-1	Left Instruction card
C-12923	Transfer Tray Assembly	16-2009-101	Instruction Manual
C-12937	Back Stop Lamp Assembly		
C-13061	3 Switch PC Board		
		31-1002-2009	Screened Playfield
D-12848	Shoot-lane Scoop Assembly	31-1357-2009	Screened Backglass
D-12857	Back Panel Assembly	31-1475-2009	Back Panel Screened
H-12192-2009	Cabinet Cable		
H-12924	Switch Cable		
H-12925	Lamp Cable		
H-12926	Solenoid Cable		
H-13135	Left Ramp Exit Cable		
H-13136	Right Ramp Exit Cable		
H-13137	Center Targets Cable		
H-13138	Left Ramp Entrance Cable		
H-13139	Left Return Lane Cable		
H-13141	Center Ramp Cable		
H-13175	Insert Cable		
01-9214-1	Ramp Enter Plate 1-3/8		
01-9214-2	Ramp Enter Plate 1-7/16		
01-9220	Ball Stop Bracket		
01-9221	Retainer Plate		
01-9225	Shooter Lane Scoop		
01-9226	Multi-ramp Enter Scoop		
01-9227	Left Exit Scoop		
01-9234	Ball Transfer Tray		
01-9235	Diverter Housing		
01-9236	Diverter Plate		

**Pinout Table for Display Glasses used on
Bally L-Display Board (D-12706)
and R-Display Board (D-12502)**

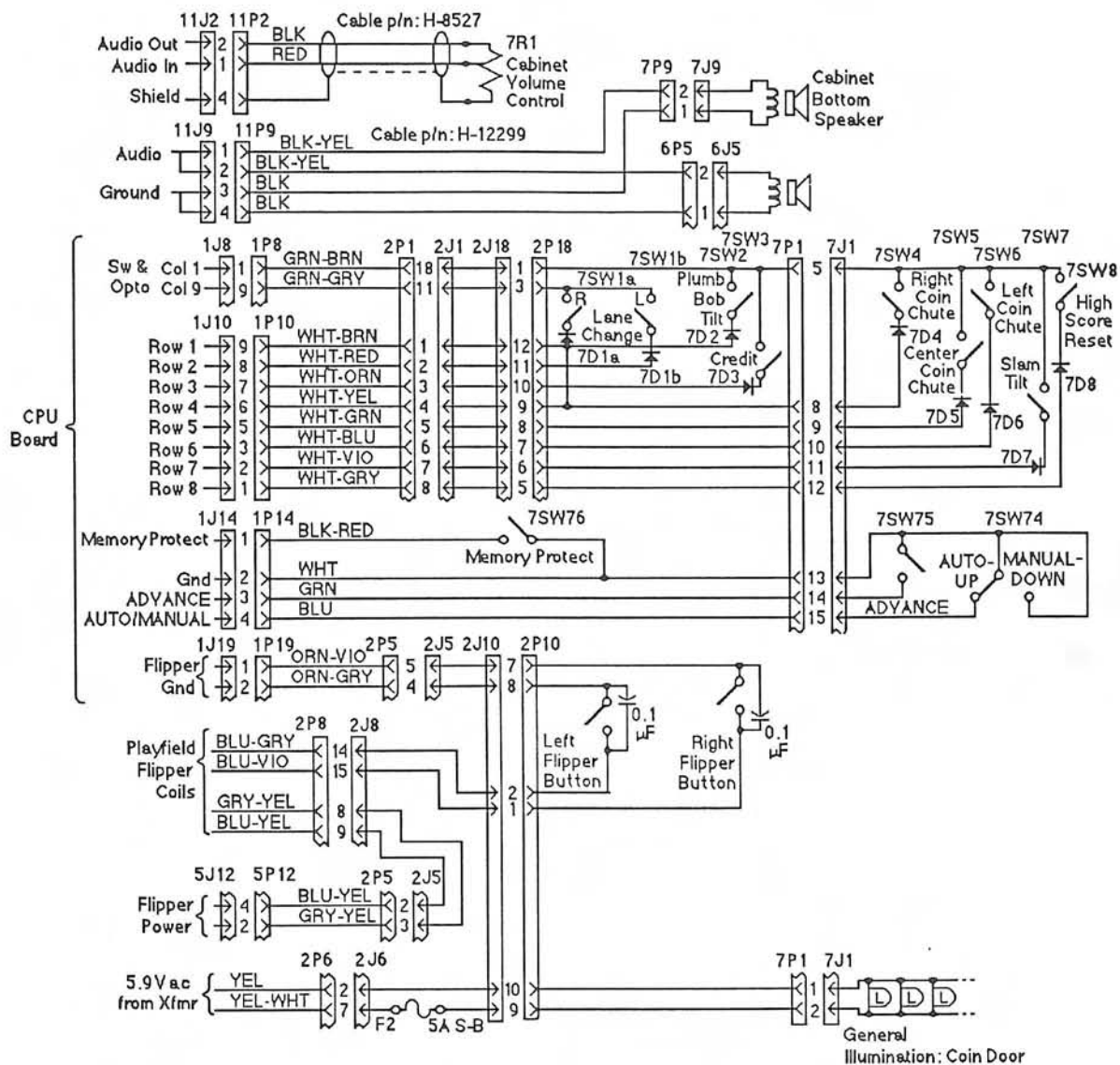
(Also applicable to Williams Master Display, D-12232-1 and D-12232-2)

Board Pin #	Glass Pin #	Signal/ Function	Board Pin #	Glass Pin #	Signal/ Function	Board Pin #	Glass Pin #	Signal/ Function
1	1	Not connected	25	31	Strobe 11	36	61	Strobe 6
2	2	Segment A		32	cut		62	cut
3	3	Segment J	26	33	Strobe 11	37	63	Strobe 5
4	4	Segment B		34	cut		64	cut
5	5	Strobe 16		35	cut	38	65	Strobe 5
6	6	Segment K		36	cut		66	cut
7	7	Strobe 16	27	37	Strobe 10		67	cut
8	8	Segment H		38	cut		68	cut
9	9	Segment F	28	39	Strobe 10	39	69	Strobe 4
10	10	Segment M		40	cut		70	cut
11	11	Strobe 15	29	41	Strobe 9	40	71	Strobe 4
12	12	Segment C		42	cut		72	cut
13	13	Strobe 15	30	43	Strobe 9		73	cut
14	14	Not connected		44	cut		74	cut
15	15	Strobe 14		45	cut	41	75	Strobe 3
16	16	Dot		46	cut		76	cut
17	17	Strobe 14	31	47	Strobe 8	42	77	Strobe 3
18	18	Segment D		48	cut		78	cut
19	19	Strobe 13	32	49	Strobe 8	43	79	Strobe 2
20	20	Dot		50	cut	44	80	Comma
21	21	Strobe 13		51	cut	45	81	Strobe 2
22	22	Not connected		52	cut	46	82	Segment P
	23	cut	33	53	Strobe 7	47	83	Segment R
	24	cut		54	cut	48	84	Segment E
23	25	Strobe 12	34	55	Strobe 7	49	85	Strobe 1
	26	cut		56	cut	50	86	Segment N
24	27	Strobe 12	35	57	Strobe 6	51	87	Strobe 1
	28	cut		58	cut	52	88	Segment
	29	cut		59	cut	53	89	- 100V dc
	30	cut		60	cut			

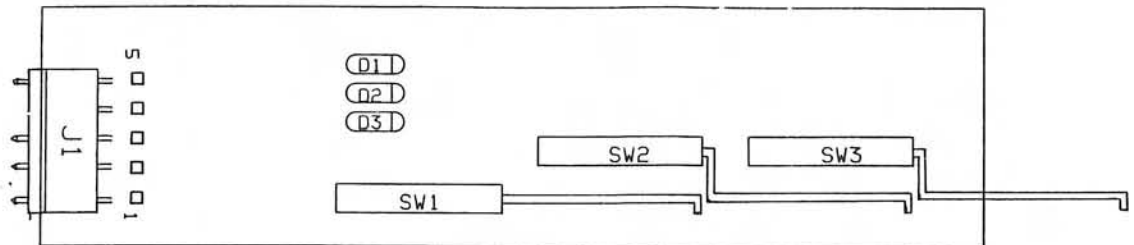
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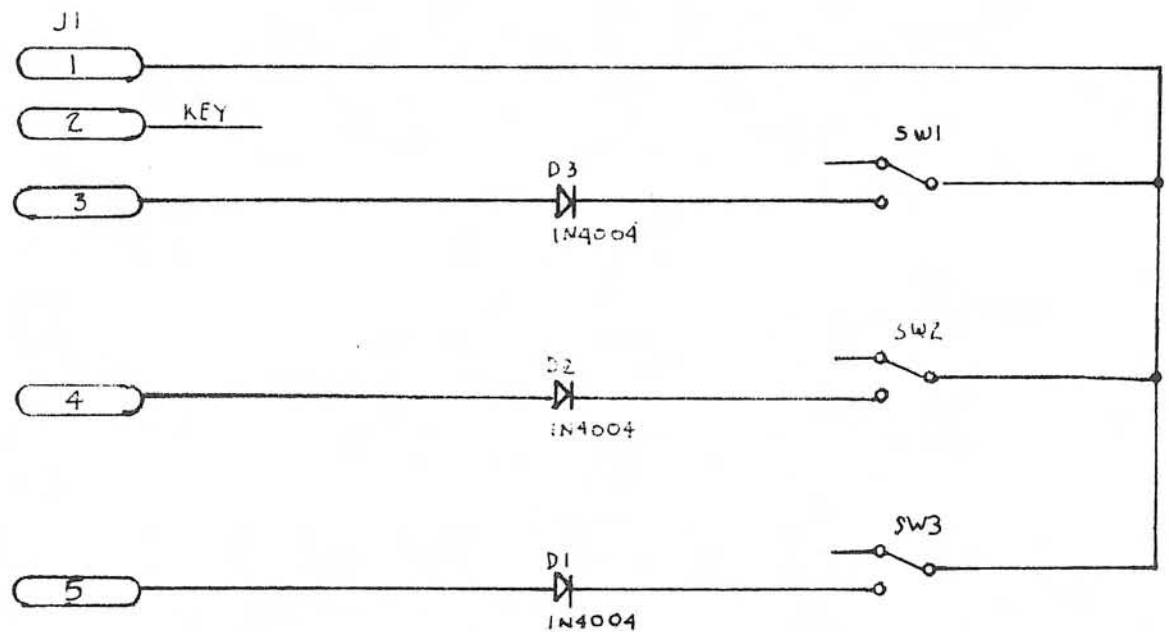
***Reference Diagrams
and
Schematics***



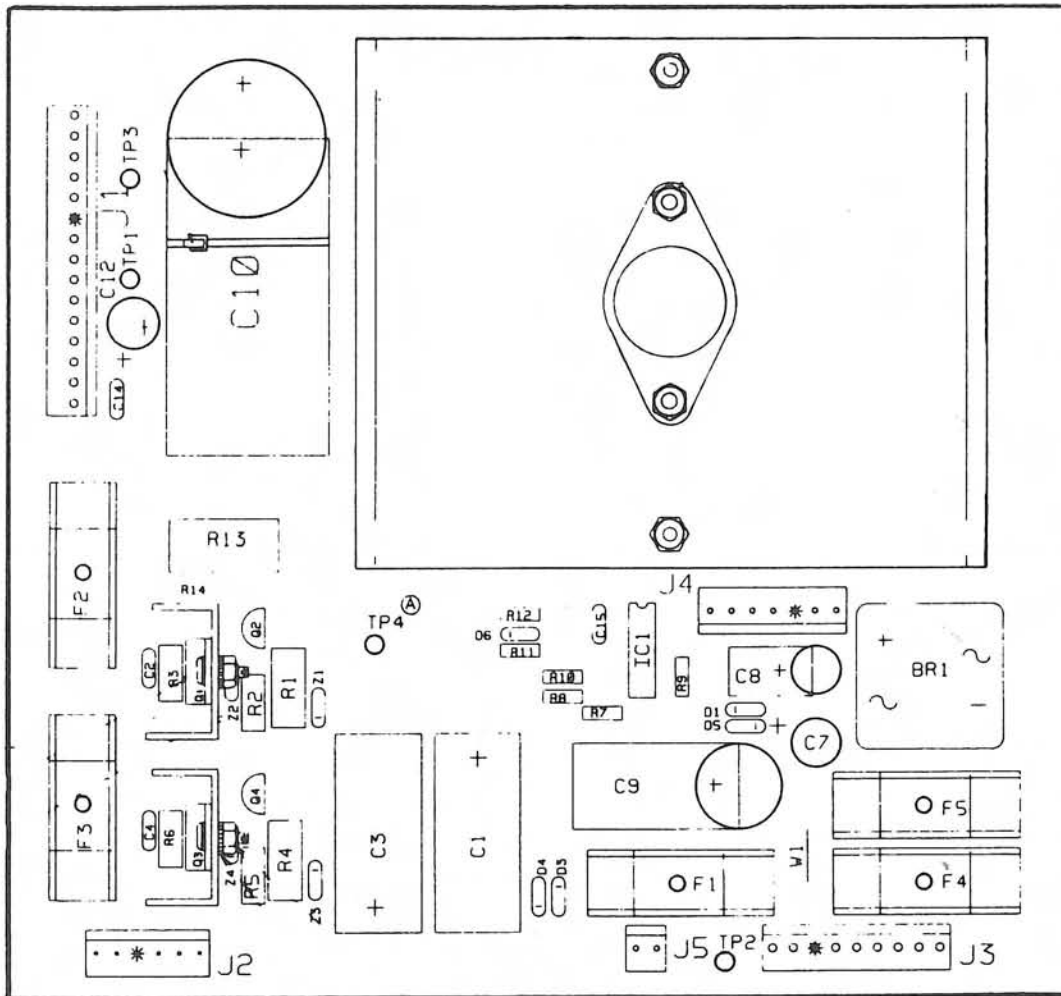
MOUSIN' AROUND Cabinet Wiring



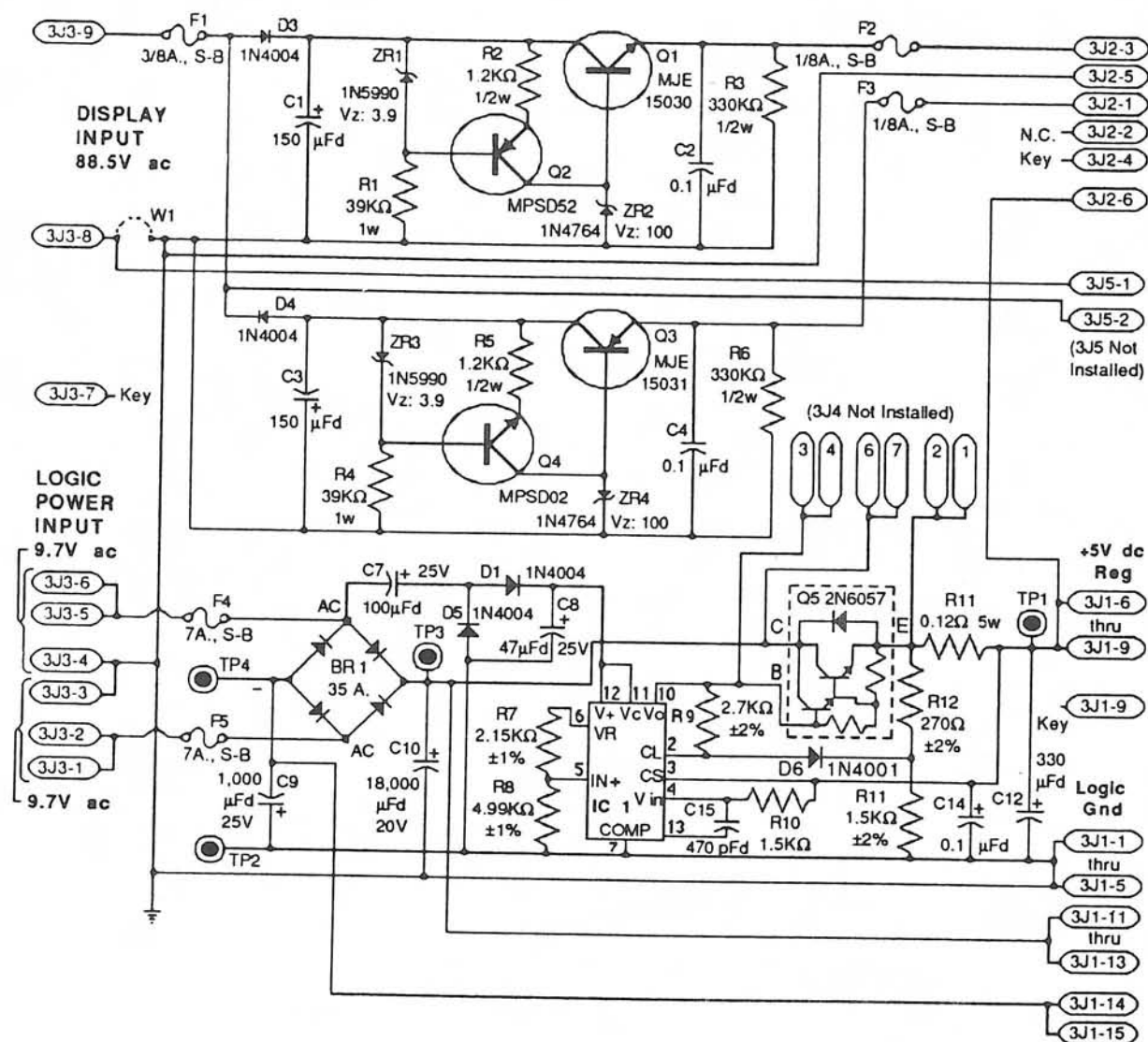
3 Switch PC Board



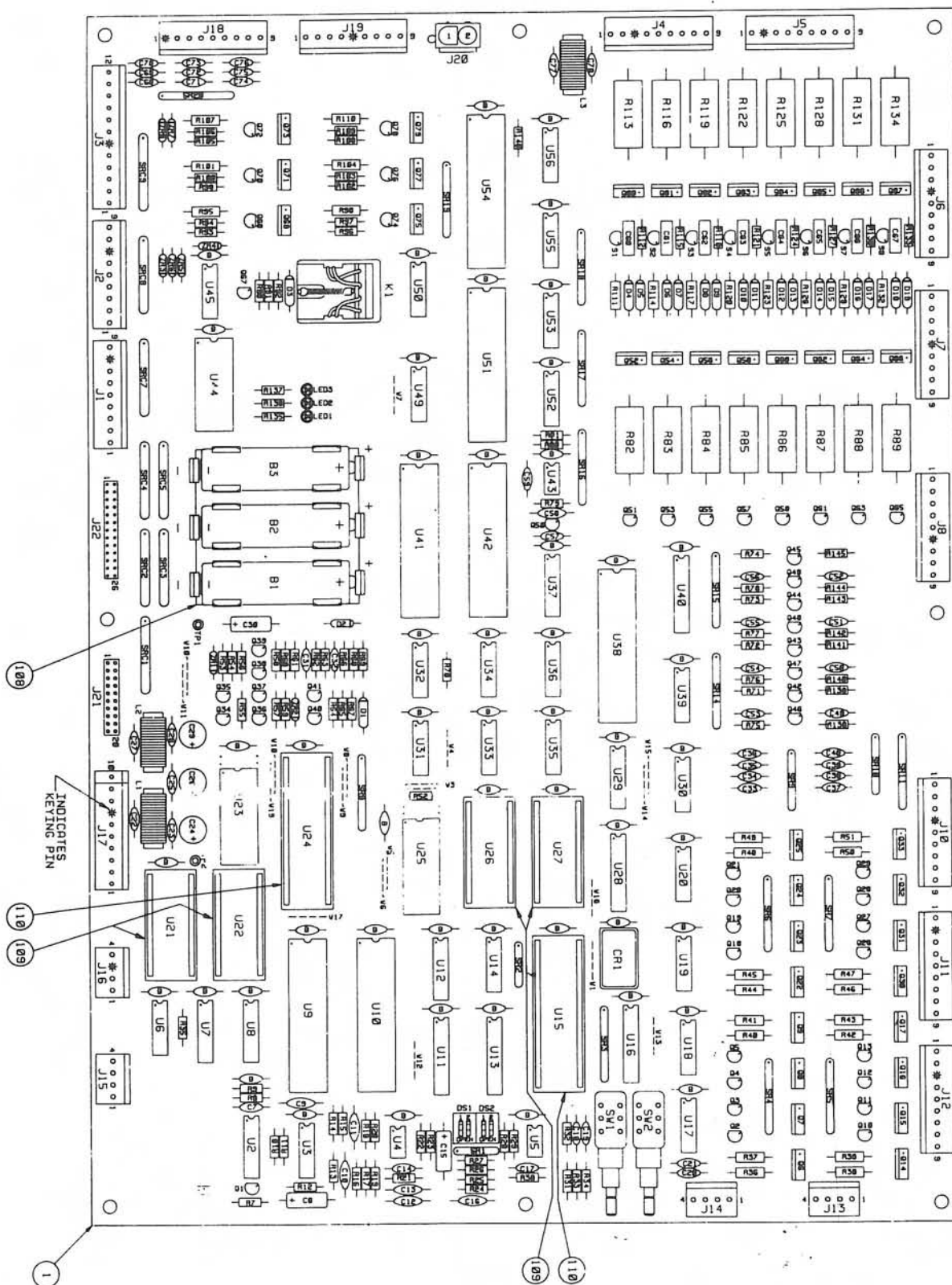
3 Switch PC Board Schematic



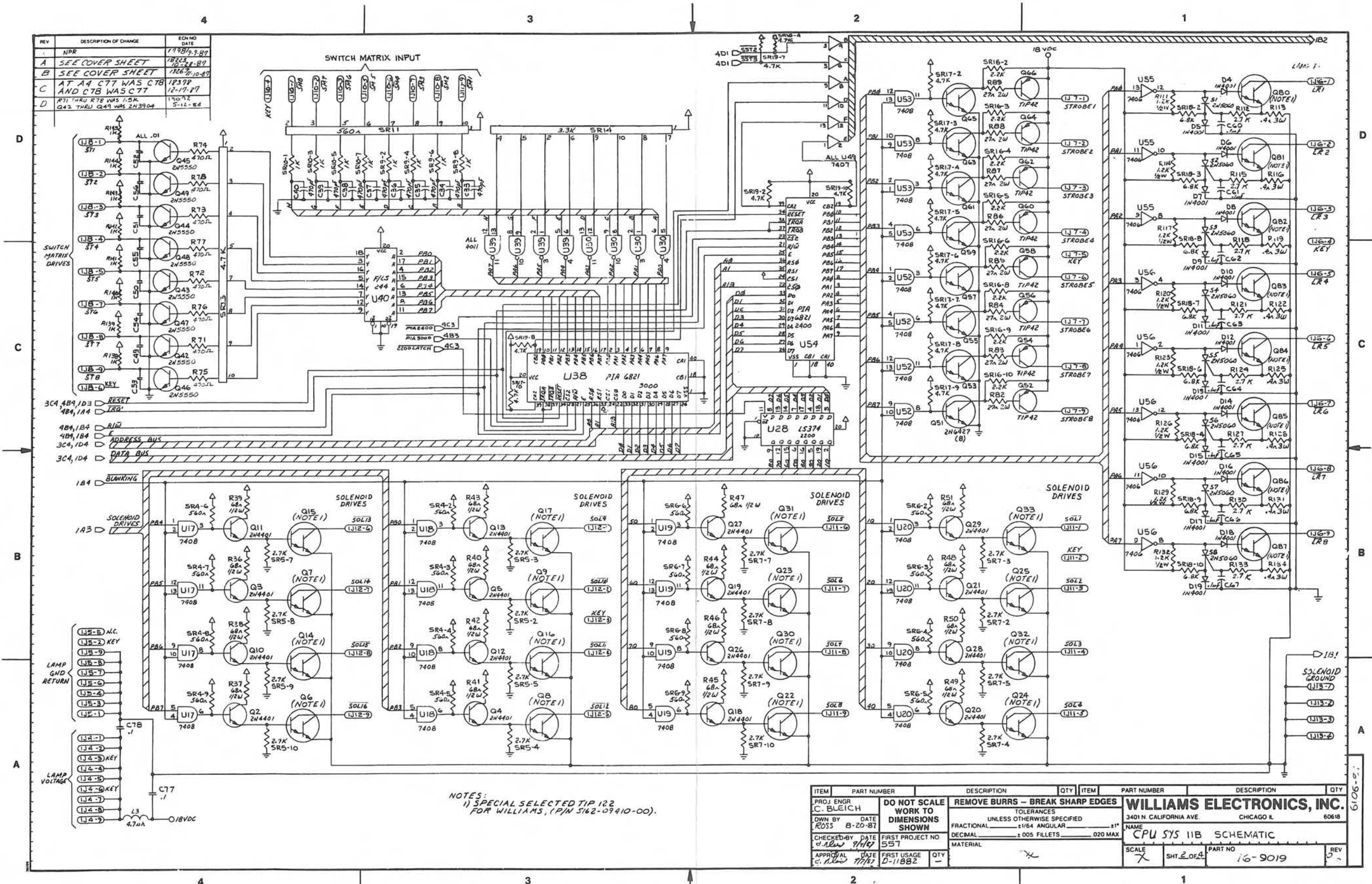
POWER SUPPLY BOARD
p/n D-12246



POWER SUPPLY BOARD SCHEMATIC

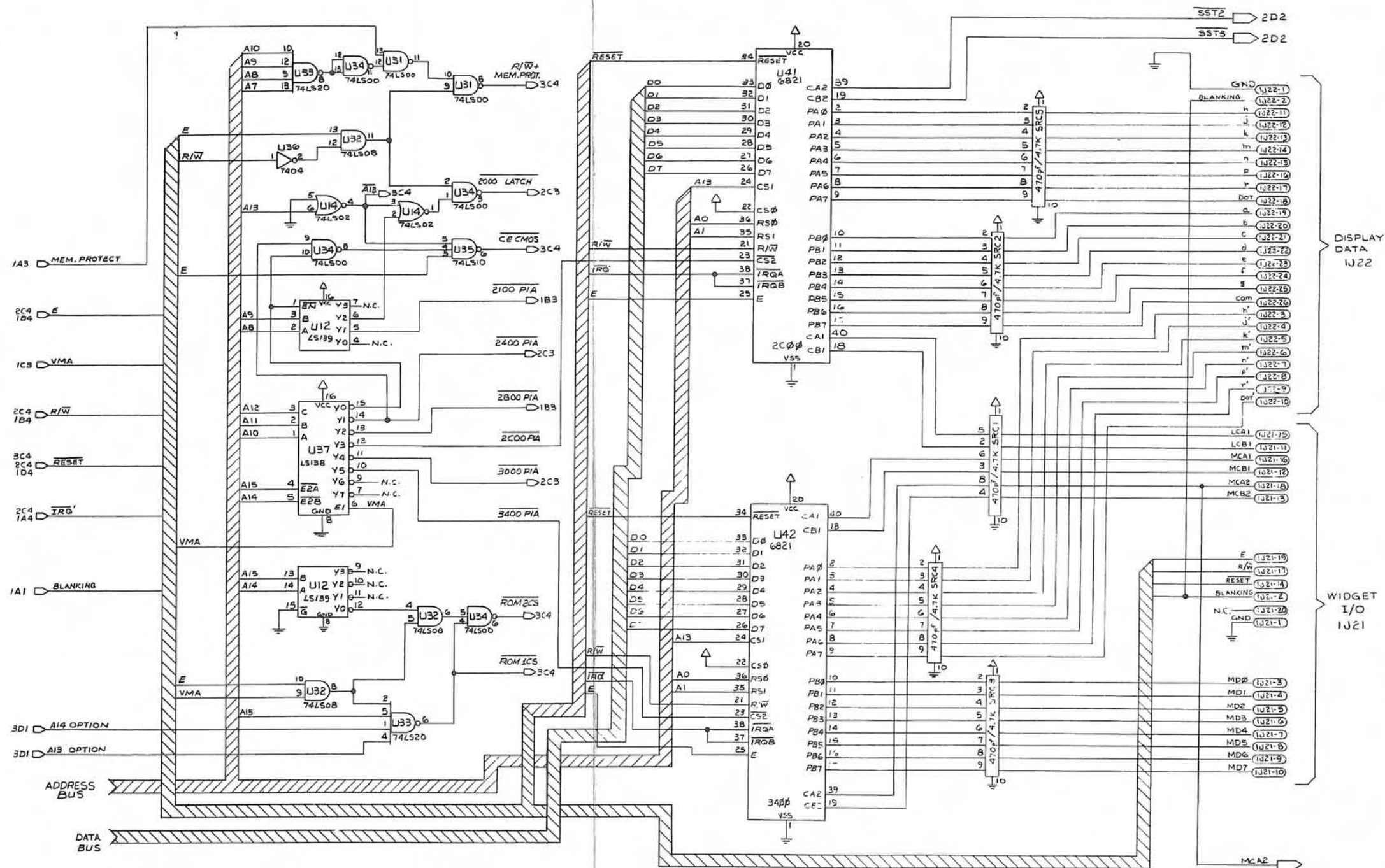


System 11B CPU Board (D-11883)



System 11B CPU Schematic (16-9019, Sheet 2 of 4)

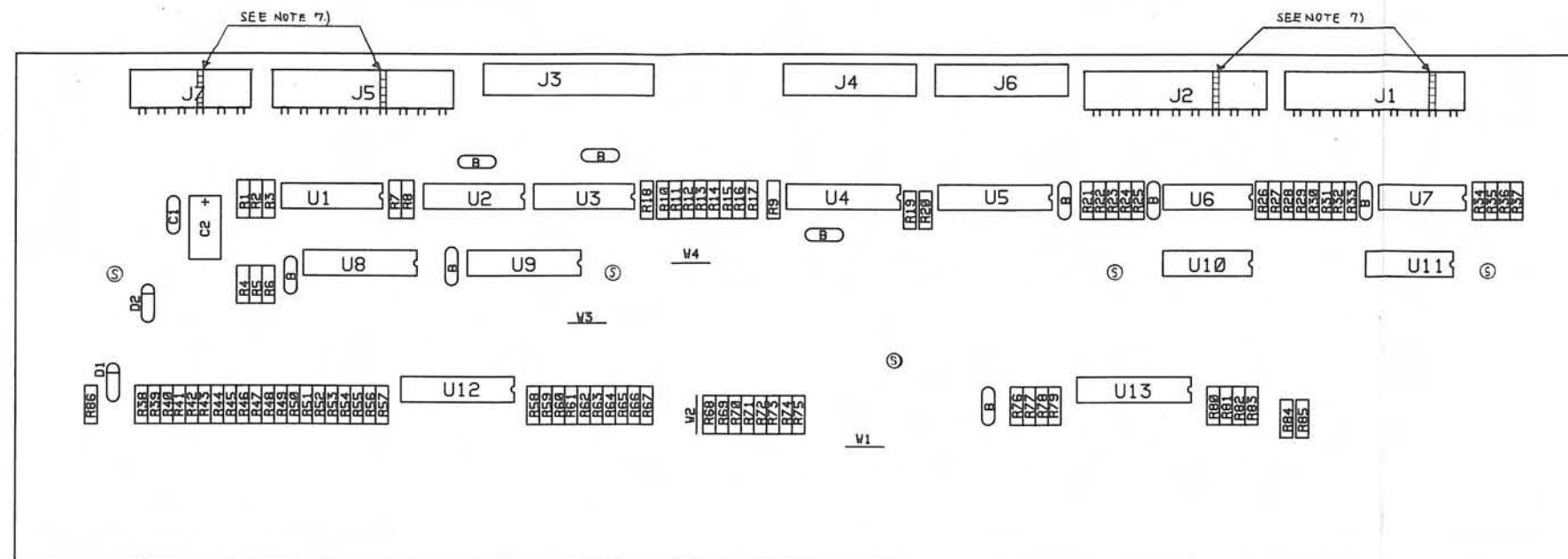
REV	DESCRIPTION OF CHANGE	EDN NO	DATE
	N. P. R.	1978	2-7-87
A	SEE COVER SHEET	1822	10-20-87
B	SEE COVER SHEET	1823	10-20-87
C	SEE SHEET 1-3	1824	12-1-87



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	C. BLEICH	DO NOT SCALE		REMOVE BURRS - BREAK SHARP EDGES		WILLIAMS ELECTRONICS, INC.	
OWN BY	DATE	WORK TO DIMENSIONS SHOWN		TOLERANCES		3401 N CALIFORNIA AVE	CHICAGO IL 60618
CHECKED BY	DATE	FIRST PROJECT NO	557	FRACTIONAL	UNLESS OTHERWISE SPECIFIED	NAME	CPU SYS 11B SCHEMATIC
APPROVAL	DATE	FIRST USAGE	D-11882	DECIMAL	1/164 ANGULAR	SCALE	N/S
					1/1005 FILETS	SHT	1 OF 4
						PART NO	16-9019
						REV	C

System 11B CPU Schematic (16-9019, Sheet 4 of 4)

REV	DESCRIPTION OF CHANGE	ECN NO
1	N. P. R. 5-1-89	21129



BALLY R-DISPLAY

ITEM	PART NUMBER	PART DESIGNATION	DESCRIPTION	QTY
1	5043-08980-00	B (BYPASS CAP)	CAP. .01HF 50V AX. CR.	9
2	5043-08998-00	C1	CAP. .1MF 50V AX. CR.	1
3	5040-08343-00	C2	CAP. 10MF 25V AX. ELECT.	1
4	5075-09135-00	D1,D2	ZENER 1N4740 10V	2
5	5670-12308-00	DSPY1	DISPLAY, 16-CHARACTER A/N:	1
6	5791-10869-09	J1,J2,J5	9 PIN HEADER, R/A.	156
7	5791-10851-00	J3	26 PIN HEADER, R/A.	100
8	5791-10869-08	J7	6 PIN HEADER, R/A.	156
9	5791-09438-00	CHART	20 PIN HEADER, R/A.	100
10	5010-08773-00	R1-R8, R21-R37	RES. 18K ohm 1/4W	25
11	5010-09182-00	NOTE 1	RES. 100K ohm 1/4W	CHART
12	5010-10258-00	NOTE 2	RES. 1M ohm 1/4W	CHART
13	5010-10927-00	NOTE 3	RES. 8.2K ohm 1/2W	CHART
14	5010-08981-00	NOTE 4	RES. 10K ohm 1/2W	CHART
15	5310-08975-00	U1,U2,U3	4049	3
16	5310-09882-00	U6,U7,U10,U11	4001	4
17	5680-08969-00	U8,U9	UDN-7180	2
18	5680-08968-00	CHART	UDN-6118	CHART
19	5010-09534-00	CHART	RES. ZERO OHM	CHART
20	5768-12378-00	PCB	BALLY-LO-DISPLAY PCB	1
21	03-8088-1	(SUPPORT) S	SUPPORT DISPLAY	5
22	SEE CHART	LABEL	ASSEMBLY I.D. LABEL	CHART

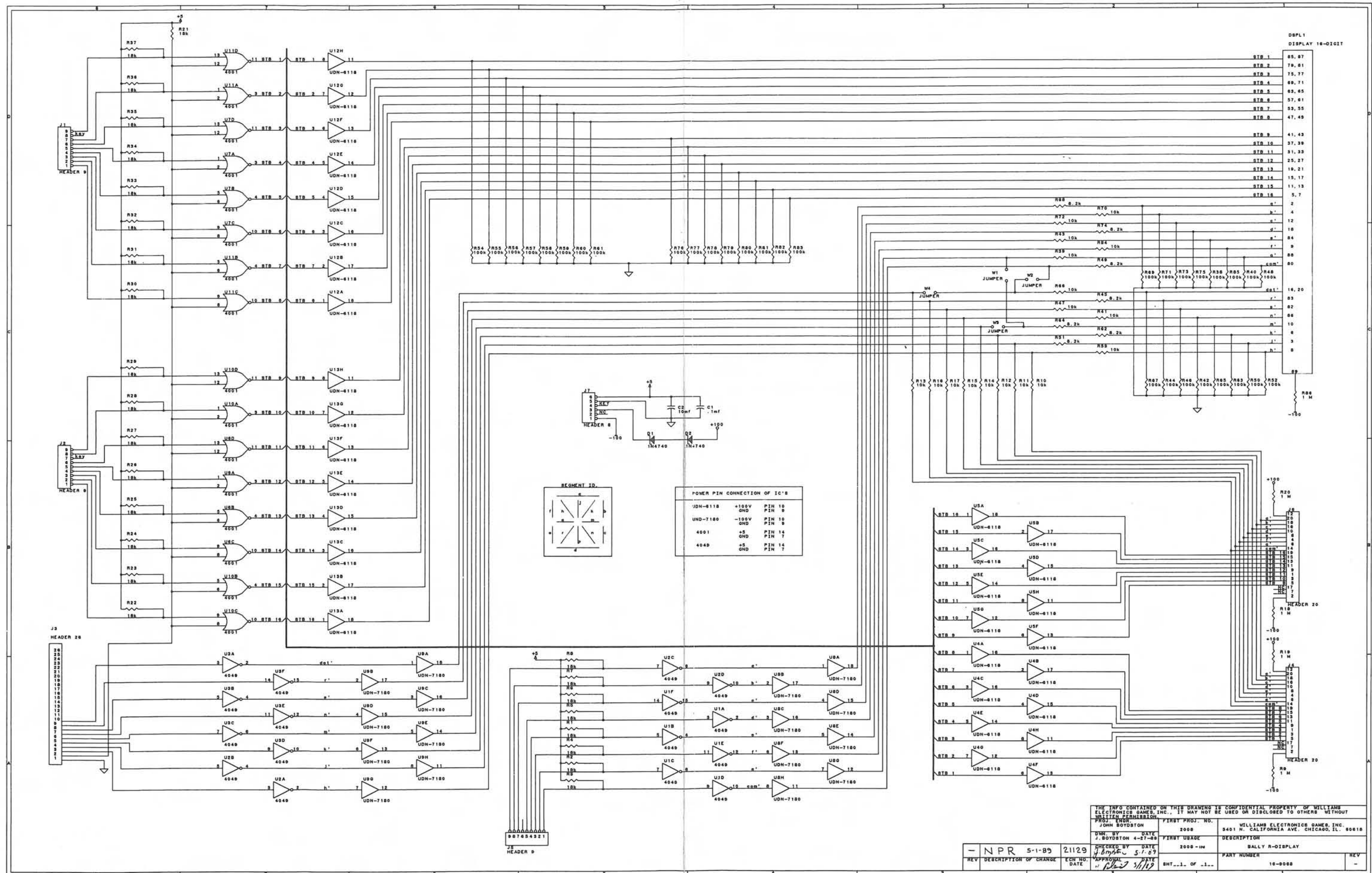
OPTION	ITEM 9	ITEM 11	ITEM 12	ITEM 13	ITEM 14	ITEM 18	ITEM 19	ITEM 22
NOTE 6	DESIGNATION	QTY	DESIGNATION	QTY	DESIGNATION	QTY	DESIGNATION	QTY
-01	NOT USED	0	R42,R44,R46,R50,R52,R63	32	SEE NOTE 2	1	R45,R51,R62	7
-02	J4	1	SEE NOTE 1	26	R9,R19	3	SEE NOTE 3	4
-03	J4,J6	2	SEE NOTE 1	26	R9,R18,R19,R20	5	SEE NOTE 3	4

NOTES:

- 100K ohm RESISTORS
R38,R40,R48,R54-R61,R65,R67,R69,R71,
R73,R75-R83,R85
SEE CHART ALSO
- 1M ohm RESISTORS
R88
SEE CHART ALSO
- 8.2K ohm RESISTORS
R49,R64,R68,R74
SEE CHART ALSO
- 10K ohm RESISTOR
R39,R43,R66,R70,R72,R84
SEE CHART ALSO
- THE CHART SPECIFIES RESISTORS, I.C.s, AND
CONNECTORS THAT ARE OPTION SPECIFIC
- THE TWO LAST DIGITS OF THE PART NUMBER
SPECIFIES THE SUB-ASSEMBLY OPTION.
-01 MAIN DISPLAY ONLY: ALPHA NUMERIC
-02 MAIN DISPLAY: NUMERIC, ONE EXTENDED
7-SEGMENT NUMERIC
-03 MAIN DISPLAY: NUMERIC, TWO EXTENDED
7-SEGMENT NUMERIC

- CUT KEYING PINS AS INDICATED
- ALIGN TOP EDGE OF GLASS DISPLAY WITH TOP EDGE OF DISPLAY SUPPORTS.
- FOR SCHEMATIC SEE DRAWING 16-9068

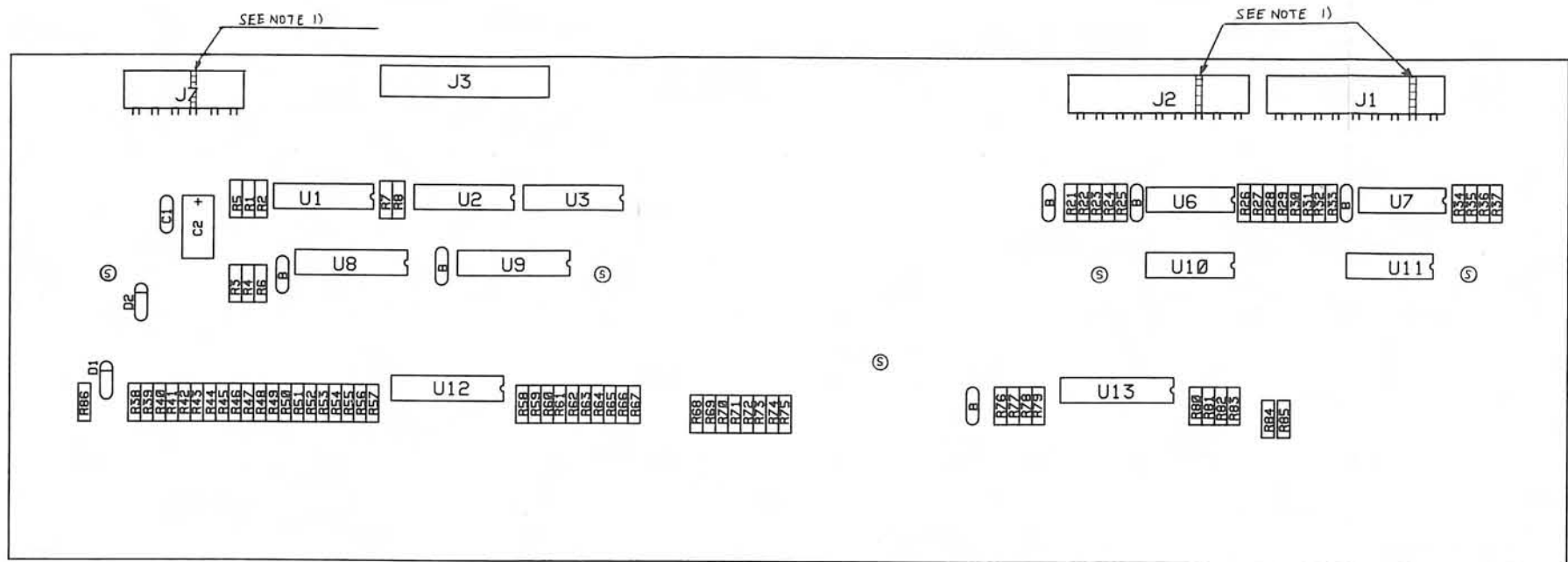
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
THE INFO CONTAINED ON THIS DRAWING IS CONFIDENTIAL PROPERTY OF WILLIAMS ELECTRONICS GAMES, INC. IT MAY NOT BE USED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION							
PROJ ENGR J. BOYDSTON		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS-BREAK SHARP CORNERS & EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL .XX ± .030 ANGULAR ± 1/2° XXX ± .015 FRACTIONAL ± 1/64		WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE CHICAGO IL 60618	
DWN BY DATE J. PARRISH		FIRST PROJECT NO 2008		MATERIAL		NAME BALLY R-DISPLAY ASSY	
CHECKED BY DATE J. Boydston 5-1-89		APPROVAL DATE H. Boydston 5/1/89		FIRST USAGE 2008-1N		SCALE 2/1	
						SHT 1 OF 1	
						PART NO D-12502	
						REV 1	



Right Display 3-12

THE INFO CONTAINED ON THIS DRAWING IS CONFIDENTIAL PROPERTY OF WILLIAMS ELECTRONICS GAMES, INC. IT MAY NOT BE USED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION			
PROJ. JOHN BOYDSTON	FIRST PROJ. NO. 2008	3401 N. CALIFORNIA AVE. CHICAGO, IL. 60618	WILLIAMS ELECTRONICS GAMES, INC.
DATE 4-27-80	DATE 5-1-80	DESCRIPTION BALLY R-DISPLAY	REV
CHECKED BY J. BOYDSTON	DATE 5-1-80	PART NUMBER 16-0000	REV
APPROVAL DATE 5/1/80	DATE 5/1/80	SHT. 1 OF 1	REV

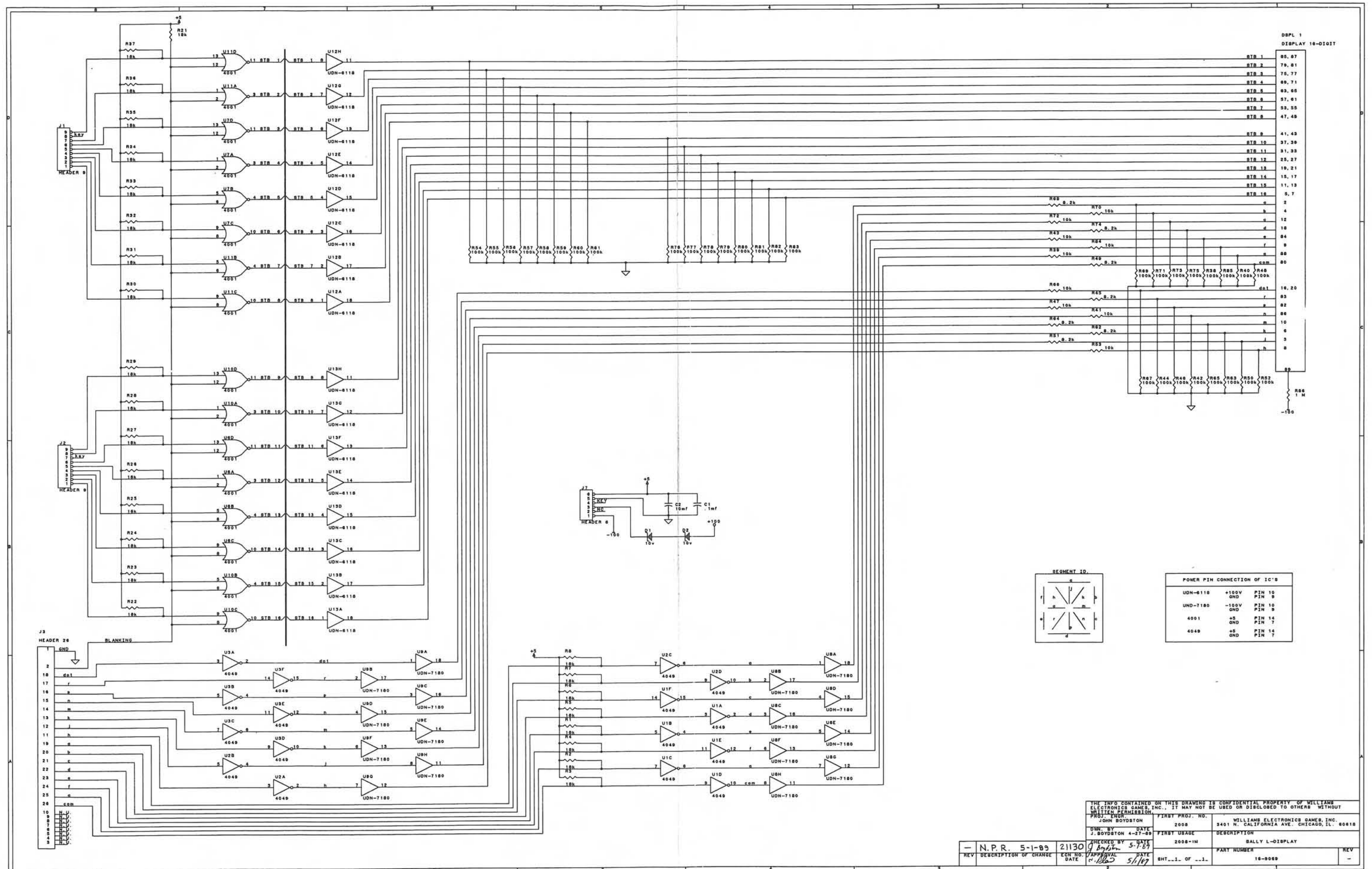
REV	DESCRIPTION OF CHANGE	ECN NO DATE
—	N. P. R. 5-1-89	21130



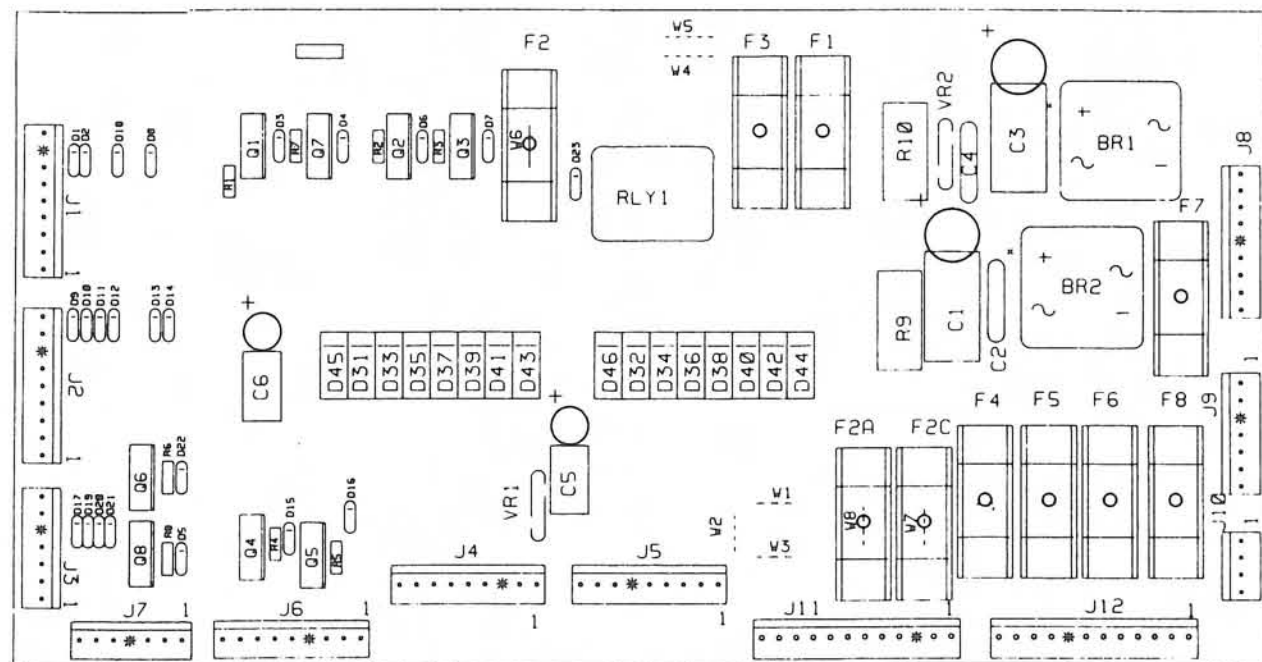
BALLY L-DISPLAY BILL OF MATERIALS				
ITEM	PART NUMBER	PART DESIGNATION	DESCRIPTION	QTY
1	5043-08980-00	B (BYPASS CAP)	CAP. .01MF 50V AX. CR.	6
2	5043-08996-00	C1	CAP. .1MF 50V AX. CR.	1
3	5040-09343-00	C2	CAP. 10MF 25V AX. ELECT.	1
4	5075-09135-00	D1, D2	ZENER 1N4740 10V	2
5	5670-12308-00	DSPY1	DISPLAY, 16-CHARACTER A/N	1
6	5791-10869-09	J1, J2	9 PIN HEADER, R/A. .156	2
7	5791-10851-00	J3	26 PIN HEADER, R/A. .100	1
8	5791-10869-06	J7	6 PIN HEADER, R/A. .156	1
9	5010-08773-00	R1-R8, R21-R37	RES. 18K ohm 1/4W	25
10	5010-09162-00	R38, R40, R42, R44, R46, R48, R50, R52, R54, R55-R61, R63, R65, R67, R69, R71, R73, R75-R83, R85	RES. 100K ohm 1/4W	32
11	5010-08981-00	R39, R41, R43, R47, R53, R66, R70, R72, R84	RES. 10K ohm 1/2W	9
12	5010-10927-00	R45, R49, R51, R62, R64, R68, R74	RES. 8.2K ohm 1/2W	7
13	5010-10258-00	R86	RES. 1M ohm 1/4W	1
14	5310-08975-00	U1, U2, U3	4049	3
15	5310-09882-00	U6, U7, U10, U11	4001	4
16	5680-08969-00	U8, U9	UDN-7180	2
17	5680-08968-00	U12, U13	UDN-6118	2
18	5768-12408-00	PCB	BALLY-HI-DISPLAY PCB	1
19	03-8088-1	(SUPPORT) S	SUPPORT DISPLAY	5

- NOTES:
- 1) CUT KEYING PINS AS INDICATED.
 - 2) ALIGN TOP EDGE OF GLASS DISPLAY WITH TOP EDGE OF DISPLAY SUPPORTS.
 - 3) FOR SCHEMATIC SEE DRAWING 16-9069

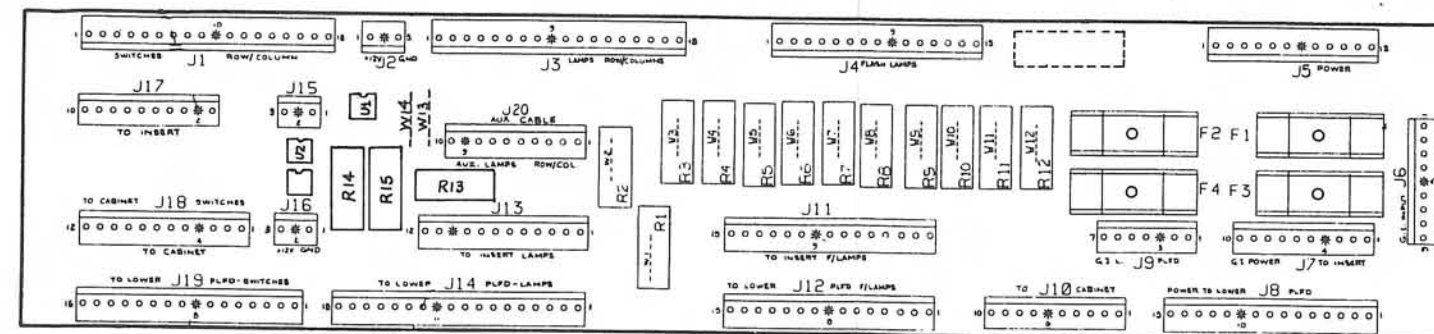
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
THE INFO CONTAINED ON THIS DRAWING IS CONFIDENTIAL PROPERTY OF WILLIAMS ELECTRONICS GAMES, INC. IT MAY NOT BE USED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION							
PROJ ENGR J. BOYDSTON		DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS-BREAK SHARP CORNERS & EDGES		WILLIAMS ELECTRONICS, INC.	
OWN BY J. PARRICH		DATE 5-1-89		TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL .X ±.030 ANGULAR ±1/2° XXX ±.015 FRACTIONAL ±1/64		3401 N CALIFORNIA AVE CHICAGO IL 60618	
CHECKED BY J. PARRICH		DATE 5-1-89		FIRST PROJECT NO 2008		NAME BALLY L-DISPLAY ASSY	
APPROVAL J. PARRICH		DATE 5/1/89		FIRST USAGE 2008-1N		SCALE 2/1	
				QTY 1		SHT 1 OF 1	
						PART NO D-12706	
						REV —	



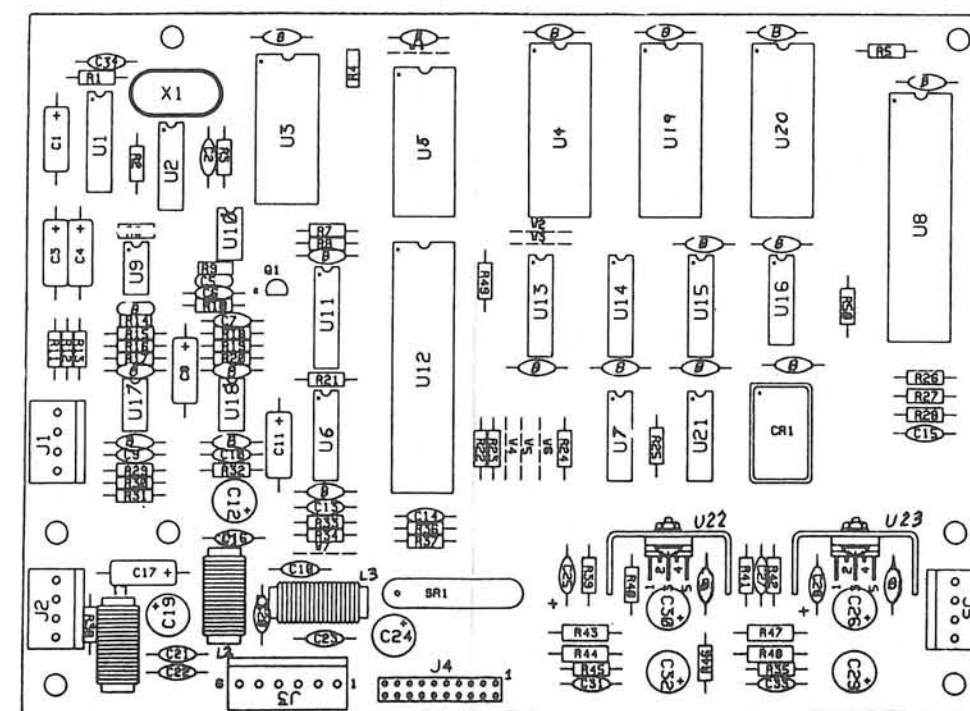
Left Display 3-14



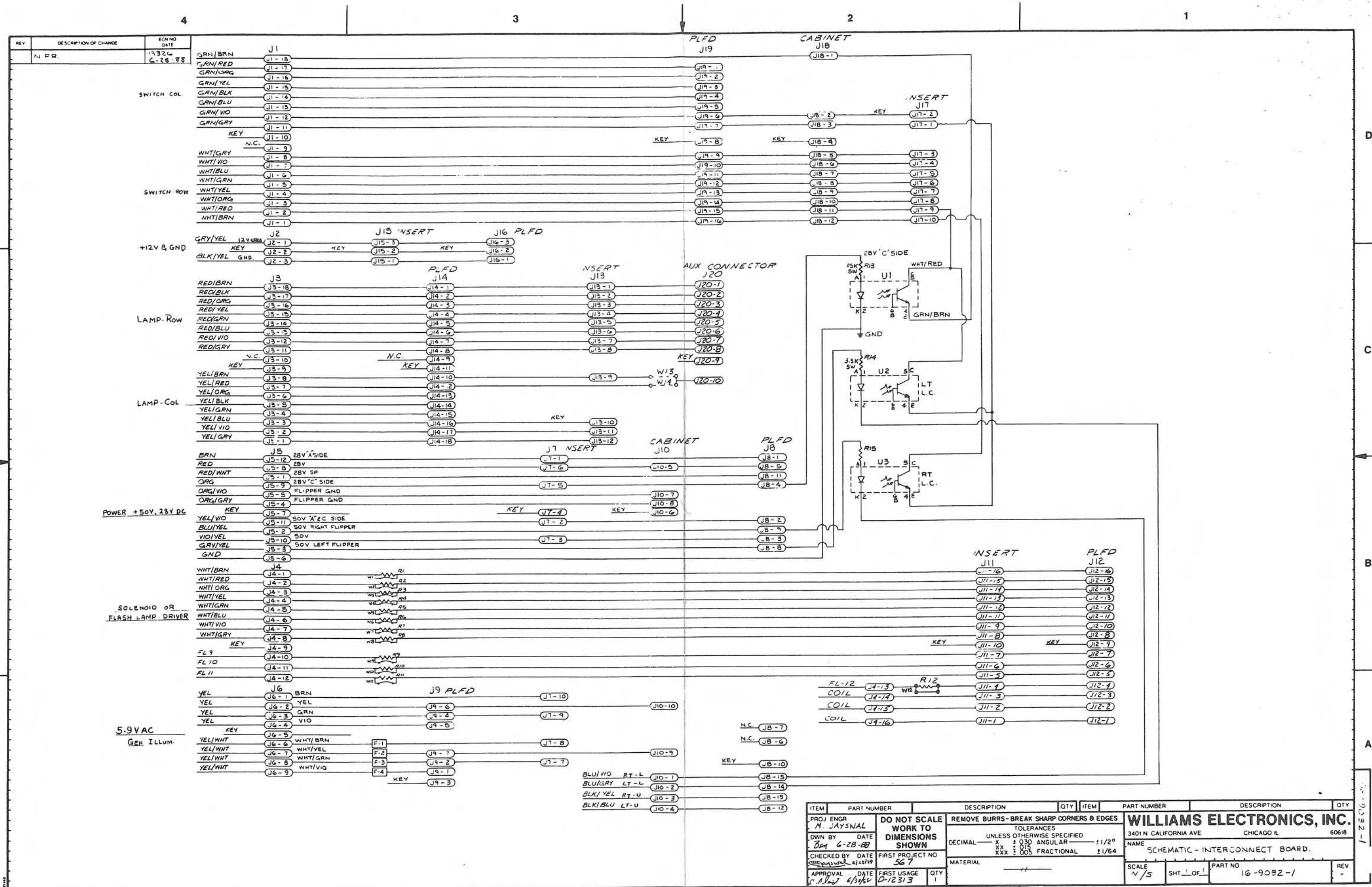
AUX POWER DRIVER UNIT BOARD
p/n D-12247



BACKBOX INTERCONNECT BOARD
p/n D-12313



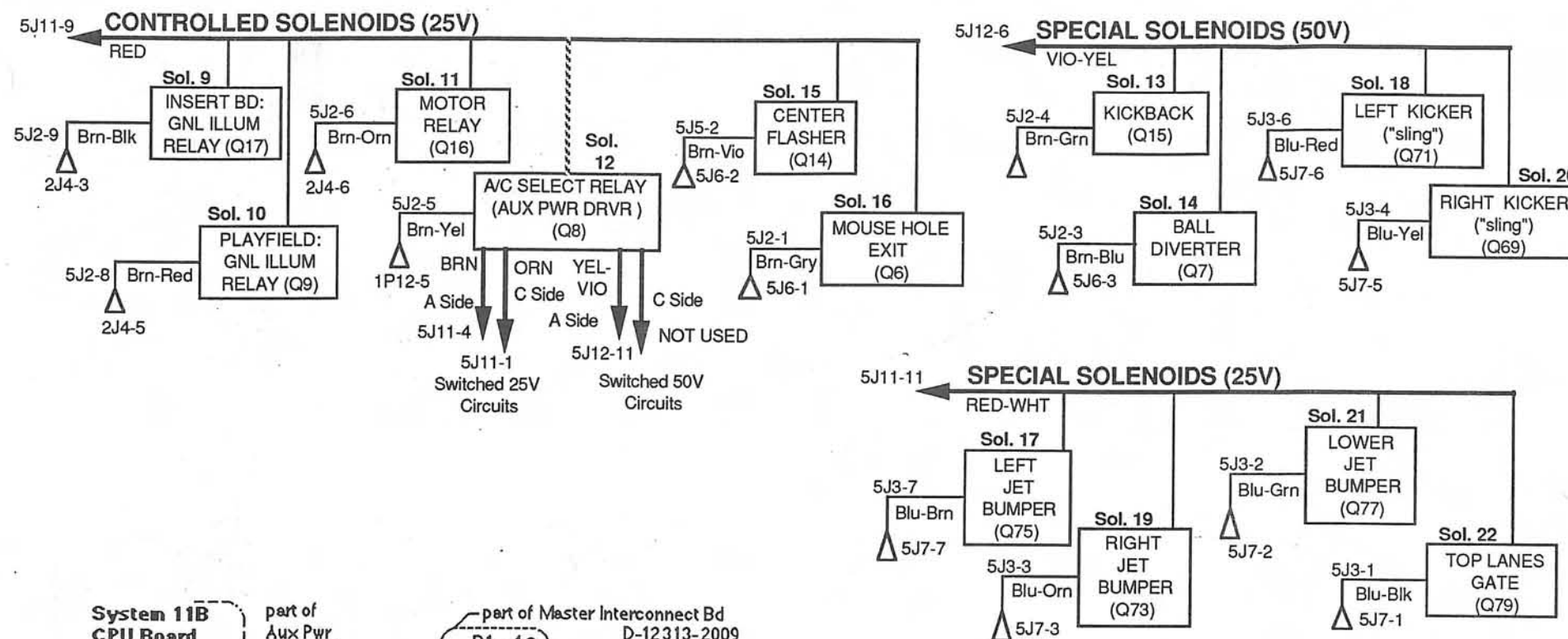
AUDIO BOARD ASSEMBLY
p/n D-11581



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	M. JAYSAL	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BURRS-BREAK SHARP CORNERS & EDGES			
DWN BY	DATE			TOLERANCES UNLESS OTHERWISE SPECIFIED			
CHECKED BY	DATE			DECIMAL	XX ± 0.30 ANGULAR	± 1/2°	
APPROVAL	DATE			XXX ± 0.05 FRACTIONAL	± 1/64		
FIRST PROJECT NO	567			MATERIAL			
FIRST USAGE	D-12313						
QTY	1						

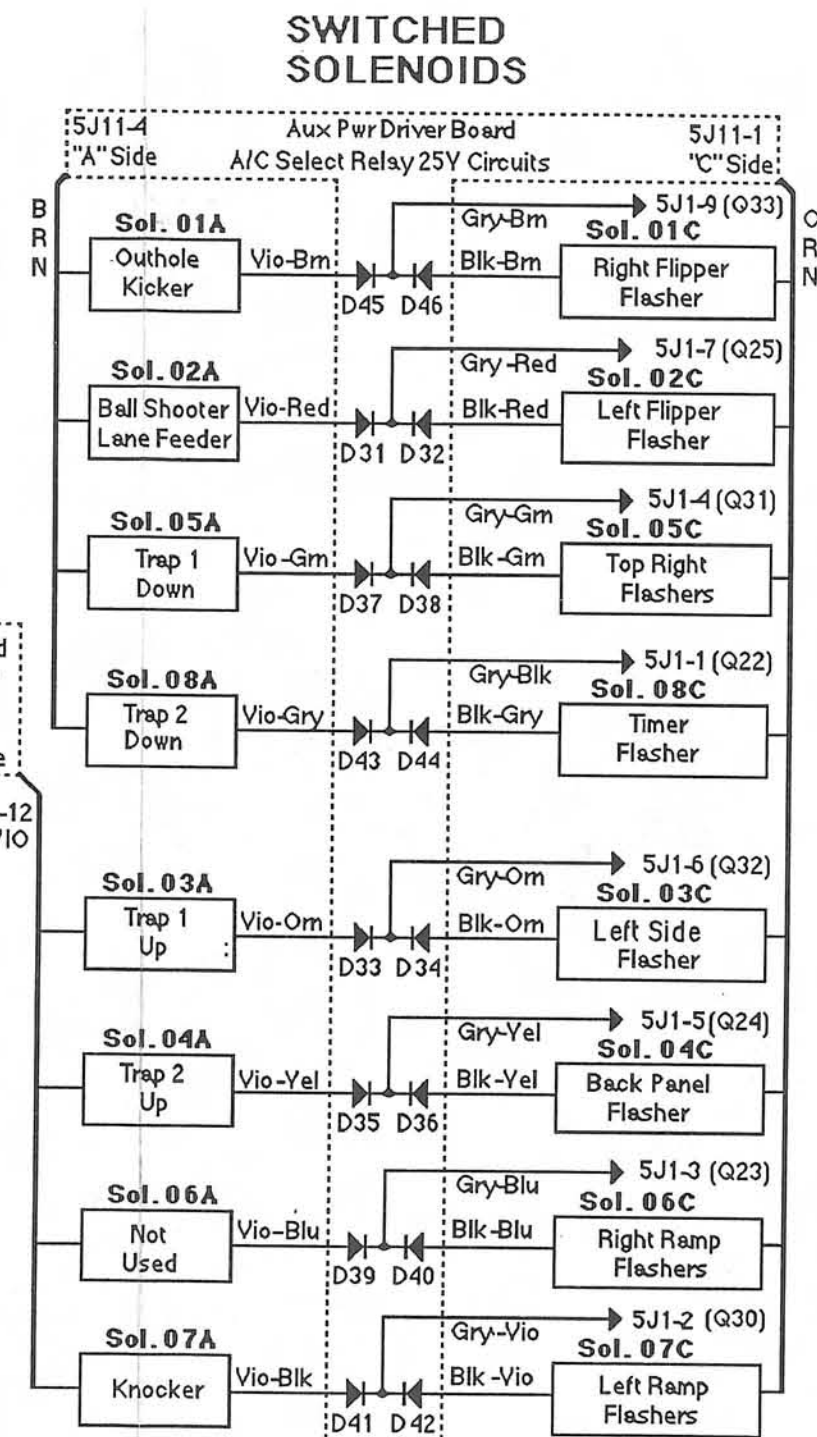
WILLIAMS ELECTRONICS, INC.	
3401 N. CALIFORNIA AVE	CHICAGO IL 60618
NAME SCHEMATIC - INTERCONNECT BOARD.	
SCALE 1/5	SHT 1 OF 1
PART NO 16-9032-1	REV



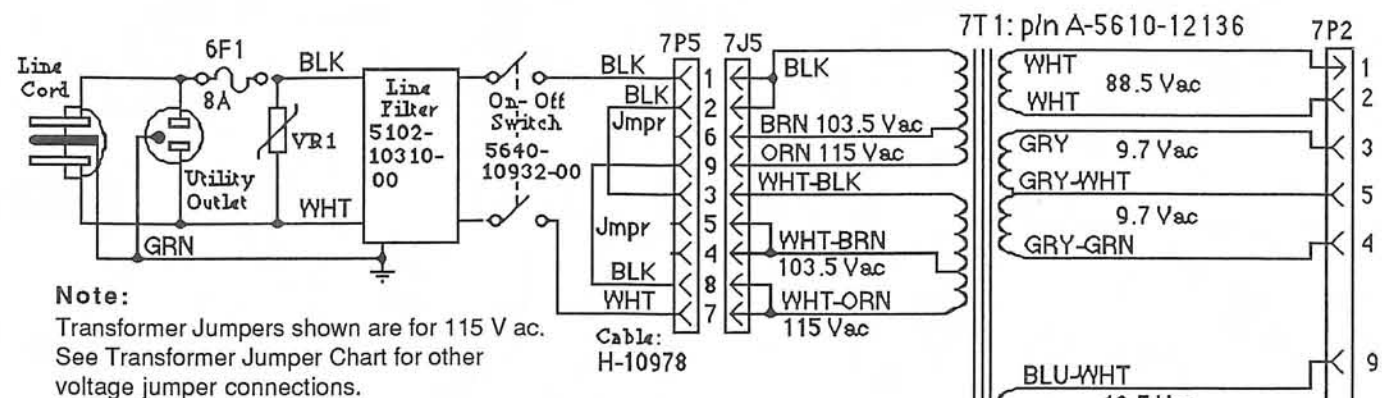


Aux Pwr Driver Bd
A/C Select Relay
50V Circuits
A Side

5J12-11, -12
YEL-VIO

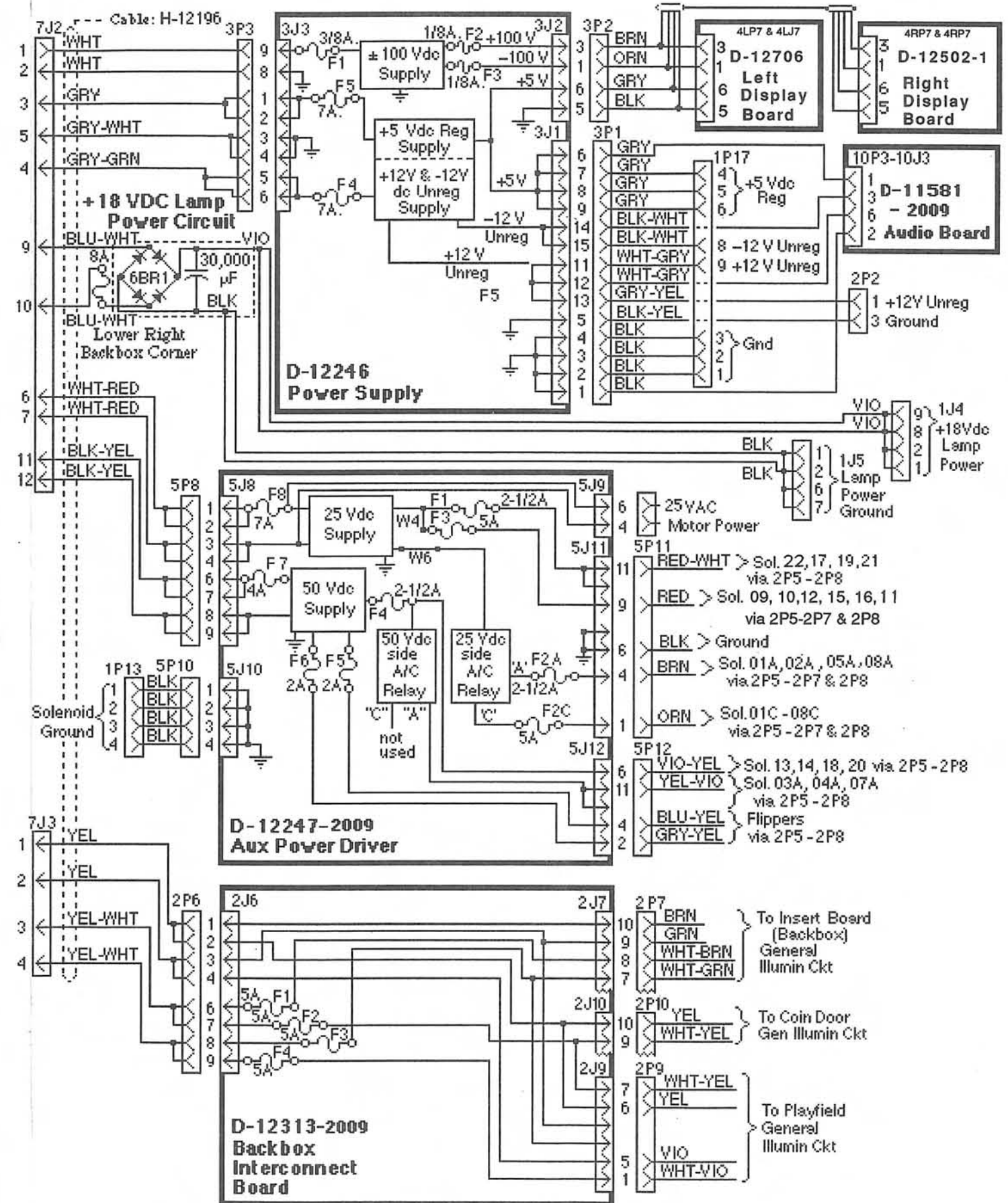
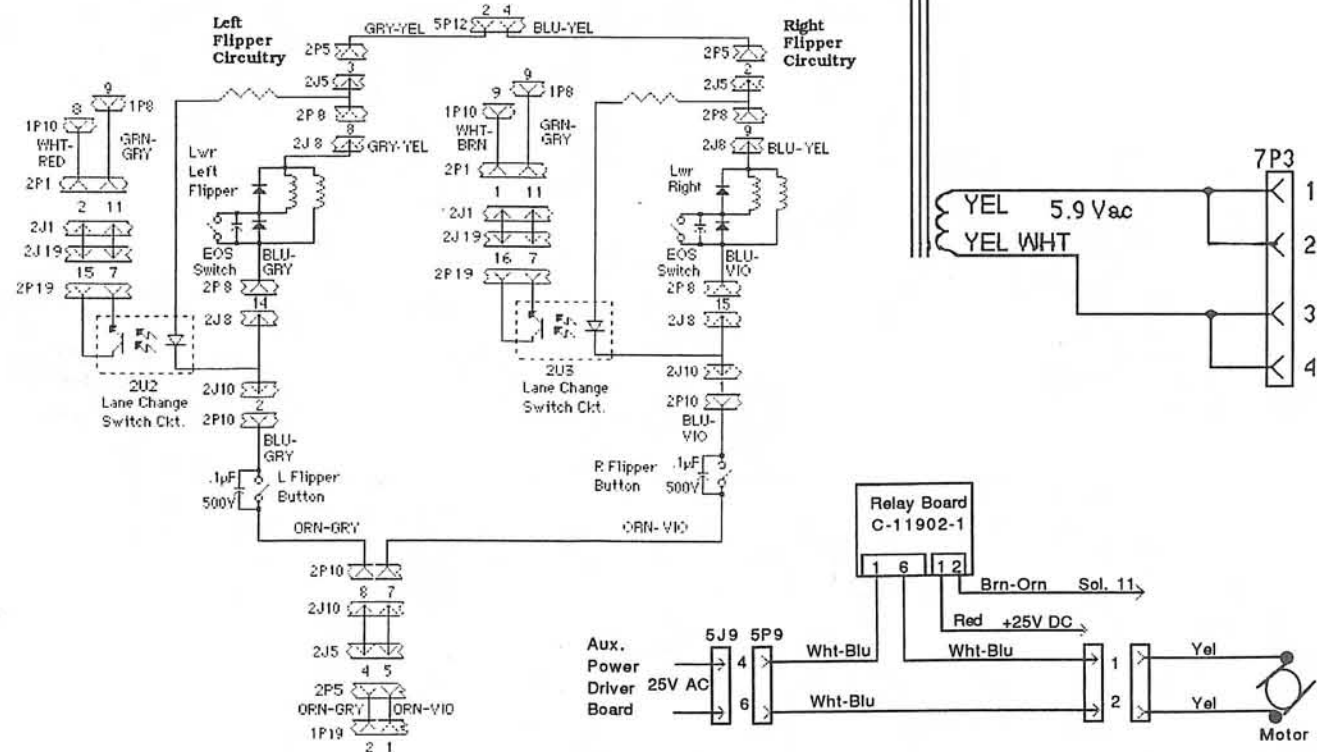


Controlled, Special &, Switched Solenoids



Note:
Transformer Jumpers shown are for 115 V ac.
See Transformer Jumper Chart for other voltage jumper connections.

TRANSFORMER JUMPER CHART		
206/218 VAC	230 VAC	103.5 VAC
7P5 BLK 1 2 6 9 3 5 4 8 7 206V 218V WHT 4 8 7	7P5 BLK 1 2 6 9 3 5 4 8 7 WHT 4 8 7	7P5 BLK 1 2 6 9 3 5 4 8 7 WHT 4 8 7
FUSE (6F1): 4A, S-B	4A, S-B	8A, N-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, N-B Fuse: 5730-09252-00 (for 115V)		



Power Wiring Diagram

BACKBOX INTERCONNECT BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
2J1-1	WHT-BRN	Switch Row 1 /1J11-9	2J2-1	GRY-YEL	+12Vdc Unreg/3J1-13
2J1-1	WHT-RED	Switch Row 2 /1J11-8	2J2-2	---	No Connection
2J1-3	WHT-ORG	Switch Row 3 /1J11-7	2J2-3	BLK-YEL	Ground/3J1-5
2J1-4	WHT-YEL	Switch Row 4 /1J11-6			
2J1-5	WHT-GRN	Switch Row 5 /1J11-5	2J3-1	YEL-GRY	Lamp Col 8 (Q51/52)/1J7-9
2J1-6	WHT-BLU	Switch Row 6 /1J11-3	2J3-2	YEL-VIO	Lamp Col 7 (Q53/54)/1J7-8
2J1-7	WHT-VIO	Switch Row 7 /1J11-2	2J3-3	YEL-BLU	Lamp Col 6 (Q55/56)/1J7-7
2J1-8	WHT-GRY	Switch Row 8 /1J11-1	2J3-4	YEL-GRN	Lamp Col 5 (Q57/58)/1J7-6
2J1-9	Key Pin	No Connection	2J3-5	YEL-BLK	Lamp Col 4 (Q59/60)/1J7-4
2J1-10	---	No Connection	2J3-6	YEL-ORG	Lamp Col 3 (Q61/62)/1J7-3
2J1-11	GRN-GRY	Switch Col 8 (Q46) /1J8-9	2J3-7	YEL-RED	Lamp Col 2 (Q63/64)/1J7-2
2J1-12	GRN-VIO	Switch Col 7 (Q42) /1J8-8	2J3-8	YEL-BRN	Lamp Col 1 (Q65/66)/1J7-1
2J1-13	GRN-BLU	Switch Col 6 (Q47) /1J8-7	2J3-9	Key Pin	No Connection
2J1-14	GRN-BLK	Switch Col 5 (Q43) /1J8-5	2J3-10	---	No Connection
2J1-15	GRN-YEL	Switch Col 4 (Q48) /1J8-4	2J3-11	RED-GRY	Lamp Row 8 (Q87) /1J6-9
2J1-16	GRN-ORG	Switch Col 3 (Q44) /1J8-3	2J3-12	RED-VIO	Lamp Row 7 (Q86) /1J6-8
2J1-17	GRN-RED	Switch Col 2 (Q49) /1J8-2	2J3-13	RED-BLU	Lamp Row 6 (Q85) /1J6-7
2J1-18	GRN-BRN	Switch Col 1 (Q45) /1J8-1	2J3-14	RED-GRN	Lamp Row 5 (Q84) /1J6-6
			2J3-15	RED-YEL	Lamp Row 4 (Q83) /1J6-5
2J4-1	WHT-BRN	Solenoid 01C In /5J5-9	2J3-16	RED-ORG	Lamp Row 3 (Q82) /1J6-3
2J4-2	WHT-RED	Solenoid 02C In /5J5-8	2J3-17	RED-BLK	Lamp Row 2 (Q81) /1J6-2
2J4-3	WHT-ORG	Solenoid 03C In /5J5-7	2J3-18	RED-BRN	Lamp Row 1 (Q80) /1J6-1
2J4-4	WHT-YEL	Solenoid 04C In /5J5-5			
2J4-5	WHT-GRN	Solenoid 05C In /5J5-4	2J5-1	RED-WHT	+25Vdc (Solenoid)/5J11-12
2J4-6	WHT-BLU	Solenoid 06C In /5J5-3	2J5-2	BLU-YEL	Flipper Power/5J12-4
2J4-7	WHT-VIO	Solenoid 07C In /5J5-2	2J5-3	GRY-YEL	Flipper Power/5J12-2
2J4-8	WHT-GRY	Solenoid 08C In /5J5-1	2J5-4	ORG-GRY	Flipper Ground Ckt/1J19-2
2J4-9	Key Pin	No Connection	2J5-5	ORG-VIO	Flipper Ground Ckt/1J19-1
2J4-10	BRN-VIO	Solenoid 15 /5J6-2	2J5-6	BLK	Ground/5J11-6
2J4-11	BRN-RED	Solenoid 10 /5J6-8	2J5-7	Key Pin	No Connection
2J4-12	BRN-ORG	Solenoid 11 /5J6-7	2J5-8	RED	+25 Vdc (Solenoid)/ 5J11-9
2J4-13	BRN-GRN	Solenoid 13/5J6-5	2J5-9	ORG	+25 Vdc ("C" Solenoids)/ 5J11-1
2J4-14	BRN-BLU	Solenoid 14 /5J6-3	2J5-10	VIO-YEL	+50 Vdc (Solenoid)/ 5J12-7
2J4-15	BLK-GRY	Solenoid 08C /5J6-1	2J5-11	YEL-VIO	+50 Vdc (Solenoid)/ 5J12-11
2J4-16	BRN-BLK	Solenoid 09 /5J6-9	2J5-12	BRN	+25 Vdc ("A" Solenoids)/5J11-5
2J6-1	YEL	Gen Illum Pwr: 6V ac	2J7-1	---	No Connection
2J6-2	YEL	Gen Illum Pwr: 6V ac	2J7-2	---	No Connection
2J6-3	YEL	Gen Illum Pwr: 6V ac	2J7-3	---	No Connection
2J6-4	YEL	Gen Illum Pwr: 6V ac	2J7-4	---	No Connection
2J6-5	Key Pin	No Connection	2J7-5	ORG	+25 Vdc ("C" Solenoids)
2J6-6	YEL-WHT	Gen Illum Pwr: 6V ac	2J7-6	RED	+25 Vdc (Solenoid)/
2J6-7	YEL-WHT	Gen Illum Pwr: 6V ac	2J7-7	WHT-GRN	Backbox Gen Illum Pwr/2J6-8
2J6-8	YEL-WHT	Gen Illum Pwr: 6V ac	2J7-8	WHT-BRN	Backbox Gen Illum Pwr/2J6-6
2J6-9	YEL-WHT	Gen Illum Pwr: 6V ac	2J7-9	GRN	Backbox Gen Illum Pwr/2J6-3
			2J7-10	BRN	Backbox Gen Illum Pwr/2J6-1
2J8-1	BRN	+25 Vdc ("A" Solenoids)	2J9-1	WHT-VIO	Playfield Gen Illum Pwr/2J6-9
2J8-2	YEL-VIO	+50 Vdc Solenoid 03A, 04A, 06A	2J9-2	---	No Connection
2J8-3	VIO-YEL	+50 Vdc Solenoid 14, 18, 20	2J9-3	---	No Connection
2J8-4	ORG	+25 Vdc ("C" Solenoids)	2J9-4	---	No Connection
2J8-5	RED	+25 Vdc Solenoid 9-11, 15, 16	2J9-5	VIO	Playfield Gen Illum Pwr/2J6-4
2J8-6 - 7	---	No Connection	2J9-6	YEL	Playfield Gen Illum Pwr/2J6-2
2J8-8	GRY-YEL	Flipper Power	2J9-7	WHT-YEL	Playfield Gen Illum Pwr/2J6-7
2J8-9	BLU-YEL	Flipper Power			
2J8-10	Key Pin	No Connection	2J11-1	BRN-BLK	Solenoid 9
2J8-11	RED-WHT	+25Vdc Solenoid 17, 19, 21	2J11-2	---	No Connection
2J8-12	---	No Connection	2J11-3	---	No Connection
2J8-13	---	No Connection	2J11-4	---	No Connection
2J8-14	BLU-GRY	Lower L Flipper	2J11-5	---	No Connection
2J8-15	BLU-VIO	Lwr R Flipper	2J11-6	---	No Connection
			2J11-7	BRN-VIO	Solenoid 15
2J10-1	BLU-VIO	Lwr R Flipper Switch	2J11-8	---	No Connection
2J10-2	BLU-GRY	Lwr L Flipper Switch	2J11-9	BLK-VIO	Solenoid 07C
2J10-3	---	No Connection	2J11-10	---	No Connection
2J10-4	BLK-YEL	Upr R Flipper Switch	2J11-11	BLK-BLU	Solenoid 06C
2J10-5	RED	+25 Vdc (Solenoid)	2J11-12	BLK-GRN	Solenoid 07C
2J10-6	---	No Connection	2J11-13	BLK-YEL	Solenoid 04C
2J10-7	ORG-VIO	R Flipper Ground Ckt	2J11-14	---	No Connection
2J10-8	ORG-GRY	L Flipper Ground Ckt	2J11-15	BLK-RED	Solenoid 02C
2J10-9	WHT-YEL	Gen Illum Pwr: 6V ac	2J11-16	BLK-BRN	Solenoid 01C
2J10-10	YEL	Gen Illum Pwr: 6V ac			
2J13-1	RED-BRN	Lamp Row 1	2J12-1	---	No Connection
2J13-2	RED-BLK	Lamp Row 2	2J12-2	BRN-GRY	Solenoid 16
2J13-3	RED-ORG	Lamp Row 3	2J12-3	BRN-BLU	Solenoid 14
2J13-4	RED-YEL	Lamp Row 4	2J12-4	BRN-GRN	Solenoid 13
2J13-5	RED-GRN	Lamp Row 5	2J12-5	BRN-ORG	Solenoid 11
2J13-6	RED-BLU	Lamp Row 6	2J12-6	BRN-RED	Solenoid 10
2J13-7	RED-VIO	Lamp Row 7	2J12-7	BRN-VIO	Solenoid 15
2J13-8	---	No Connection	2J12-8	BLK-GRY	Solenoid 08C
2J13-9	---	No Connection	2J12-9	---	No Connection
2J13-10	---	No Connection	2J12-10	BLK-VIO	Solenoid 07C
2J13-11	---	No Connection	2J12-11	BLK-BLU	Solenoid 06C
2J13-12	YEL-GRY	Lamp Col. 8	2J12-12	BLK-GRN	Solenoid 05C

BACKBOX INTERCONNECT BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
2J14-1	RED-BRN	Lamp Row 1	2J12-13	BLK-YEL	Solenoid 04C
2J14-2	RED-BLK	Lamp Row 2	2J12-14	BLK-ORG	Solenoid 03C
2J14-3	RED-ORG	Lamp Row 3	2J12-15	BLK-RED	Solenoid 02C
2J14-4	RED-YEL	Lamp Row 4	2J12-16	BLK-BRN	Solenoid 01C
2J14-5	RED-GRN	Lamp Row 5			
2J14-6	RED-BLU	Lamp Row 6	2J18-1	GRN-BRN	Switch Col 1
2J14-7	RED-VIO	Lamp Row 7	2J18-2 - 4	---	No Connection
2J14-8	RED-GRY	Lamp Row 8	2J18-5	WHT-GRY	Switch Row 8
2J14-9	YEL-BRN	Lamp Col 1	2J18-6	WHT-VIO	Switch Row 7
2J1410	---	No Connection	2J18-7	WHT-BLU	Switch Row 6
2J14-11	YEL-RED	Lamp Col 2	2J18-8	WHT-GRN	Switch Row 5
2J14-12	YEL-ORG	Lamp Col 3	2J18-9	WHT-YEL	Switch Row 4
2J14-13	YEL-BLK	Lamp Col 4	2J18-10	WHT-ORG	Switch Row 3
2J14-14	YELGRN	Lamp Col 5	2J18-11	---	No Connection
2J14-15	YEL- BLU	Lamp Col 6	2J18-12	WHT-BRN	Switch Row 1
2J14-16	YEL-VIO	Lamp Col 7			
2J14-17-18	---	No Connection	2J19-9	WHT-GRY	Switch Row 8
			2J19-10	WHT-VIO	Switch Row 7
2J19-1	GRN-RED	Switch Col 2	2J19-11	WHT-BLU	Switch Row 6
2J19-2	GRN-ORG	Switch Col 3	2J19-12	WHT-GRN	Switch Row 5
2J19-3	GRN-YEL	Switch Col 4	2J19-13	WHT-YEL	Switch Row 4
2J19-4	GRN-BLK	Switch Col 5	2J19-14	WHT-ORG	Switch Row 3
2J19-5	GRN-BLU	Switch Col 6	2J19-15	WHT-RED	Switch Row 2
2J19-6	GRN-VIO	Switch Col 7	2J19-16	WHT-BRN	Switch Row 1
2J19-7	GRN-GRY	Switch Col 8			
2J19-8	---	No Connection			

AUDIO BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
11J1-1	RED	Sound Input (from CPU) / 1J16-1	11J2-1	RED	Signal Level (to Vol Cntrl)
11J1-2	BLK	Sound Input (from CPU) / 1J16-2	11J2-2	BLK	Signal Level (from Vol Cntrl)
11J1-3	---	No Connection	11J2-3	---	No Connection
11J1-4	WHT	Ground / 1J16-4	11J2-4	shield	Ground
11J3-1	GRY	Power: +5 Vdc / 3J1-7	11J4	Ribbon Cable from CPU 1J21	
11J3-2	BLK	Ground / 3J1-1			
11J3-3	BLK-WHT	Power: -12 Vdc Unreg / 3J1-15	11J5-1	BLK-YEL / Speaker	
11J3-4	---	No Connection	11J5-2	BLK-YEL / Speaker	
11J3-5	---	No Connection	11J5-3	BLK / Speaker	
11J3-6	WHT-GRY	Power: +12 Vdc Unreg / 3J1-11	11J5-4	BLK / Speaker	

LEFT DISPLAY INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
4J1-1	BRN-GRY	ST-8: Digit Display Strobe / 1J1-1	4J2-1	VIO-GRY	ST-16: Digit Display Strobe / 1J2-1
4J1-2	BRN-VIO	ST-7: Display Digit Strobe / 1J1-2	4J2-2	VIO-BLK	ST-15: Display Digit Strobe / 1J2-2
4J1-3	BRN-BLU	ST-6: Display Digit Strobe / 1J1-3	4J2-3	VIO-BLU	ST-14: Display Digit Strobe / 1J2-3
4J1-4	BRN-GRN	ST-5: Display Digit Strobe / 1J1-4	4J2-4	VIO-GRN	ST-13: Display Digit Strobe / 1J2-4
4J1-5	BRN-YEL	ST-4 :Display Digit Strobe / 1J1-5	4J2-5	VIO-YEL	ST-12: Display Digit Strobe / 1J2-5
4J1-6	BRN-ORG	ST-3: Display Digit Strobe / 1J1-6	4J2-6	VIO-ORG	ST-11: Display Digit Strobe / 1J2-6
4J1-7	BRN-RED	ST-2: Display Digit Strobe / 1J1-7	4J2-7	Key Pin	No Connection
4J1-8	Key Pin	No Connection	4J2-8	VIO-RED	ST-8: Display Digit Strobe / 1J2-8
4J1-9	BRN-BLK	ST-1: Display Digit Strobe / 1J1-9	4J2-9	VIO-BRN	ST-9: Display Digit Strobe / 1J2-9
4J3	Ribbon Cable from CPU 1J22				
4J7-1	ORG	Display Power: -100V dc / 3J5-3	4J7-4	Key Pin	No Connection
4J7-2	---	No Connection	4J7-5	BLK	Ground / 3J5-1
4J7-3	BRN	Display Power: +100V dc / 3J5-4	4J7-6	GRY	Power: +5V dc / 3J5-6

RIGHT DISPLAY INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
(Same as for Left Display, above, plus 4J5 listed below)					
4J5-1	BLU-BRN	D1 / Display BCD / 1J3-1	4J5-6	Key Pin	No Connection
4J5-2	BLU-RED	C1 / Display BCD / 1J3-2	4J5-7	BLU-BLK	C2 / Display BCD / 1J3-7
4J5-3	BLU-ORG	B1 / Display BCD / 1J3-3	4J5-8	BLU-VIO	B2 / Display BCD / 1J3-8
4J5-4	BLU-YEL	A1 / Display BCD / 1J3-4	4J5-9	BLU-GRY	A2 / Display BCD / 1J3-9
4J5-5	BLU-GRN	D2 / Display BCD / 1J3-5			

AUX POWER DRIVER INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
5J1-1	GRY-BLK	CPU: Solenoid 8 (Q22) / 1J11-9	5J2-1	BRN-GRY	CPU: Solenoid 16 (Q6) / 1J12-9
5J1-2	GRY-VIO	CPU: Solenoid 7 (Q30) / 1J11-8	5J2-2	BRN-VIO	CPU: Solenoid 15 (Q14) / 1J12-8
5J1-3	GRY-BLU	CPU: Solenoid 6 (Q23) / 1J11-7	5J2-3	BRN-BLU	CPU: Solenoid 14 (Q7) / 1J12-7
5J1-4	GRY-GRN	CPU: Solenoid 5 (Q31) / 1J11-6	5J2-4	BRN-GRN	CPU: Solenoid 13 (Q15) / 1J12-6
5J1-5	GRY-YEL	CPU: Solenoid 4 (Q24) / 1J11-5	5J2-5	BRN-YEL	CPU: Solenoid 12 (Q8) / 1J12-5
5J1-6	GRY-ORG	CPU: Solenoid 3 (Q32) / 1J11-4	5J2-6	BRN-ORG	CPU: Solenoid 11 (Q16) / 1J12-4
5J1-7	GRY-RED	CPU: Solenoid 2 (Q25) / 1J11-3	5J2-7	Key Pin	No Connection
5J1-8	Key Pin	No Connection	5J2-8	BRN-RED	CPU: Solenoid 10 (Q9) / 1J12-2
5J1-9	GRY-BRN	CPU: Solenoid 1 (Q33) / 1J11-1	5J2-9	BRN-BLK	CPU: Solenoid 9 (Q11) / 1J12-1
5J3-1	BLU-BLK	CPU: Solenoid 22 (Q79) / 1J19-9	5J4-1	VIO-GRY	Solenoid 08A
5J3-2	BLU-GRN	CPU: Solenoid 21 (Q77) / 1J19-8	5J4-2	VIO-BLK	Solenoid 07A
5J3-3	BLU-ORG	CPU: Solenoid 19 (Q73) / 1J19-3	5J4-3	Key Pin	No Connection
5J3-4	BLU-YEL	CPU: Solenoid 20 (Q69) / 1J19-6	5J4-4	---	No Connection
5J3-5	Key Pin	No Connection	5J4-5	VIO-GRN	Solenoid 05A
5J3-6	BLU-RED	CPU: Solenoid 18 (Q71) / 1J19-4	5J4-6	VIO-YEL	Solenoid 04A
5J3-7	BLU-BRN	CPU: Solenoid 17 (Q75) / 1J19-7	5J4-7	VIO-ORG	Solenoid 03A
			5J4-8	VIO-RED	Solenoid 02A
			5J4-9	VIO-BRN	Solenoid 01A
5J5-1	WHT-GRY	Solenoid 08C / 2J4-8	5J6-1	BLK-GRY	Solenoid 08C / 2J4-15
5J5-2	WHT-VIO	Solenoid 07C / 2J4-7	5J6-2	BRN-VIO	Solenoid 15 / 2J4-10
5J5-3	WHT-BLU	Solenoid 06C / 2J4-6	5J6-3	BRN-BLU	Solenoid 14 / 2J4-14
5J5-4	WHT-GRN	Solenoid 05C / 2J4-5	5J6-4	Key Pin	No Connection
5J5-5	WHT-YEL	Solenoid 04C / 2J4-4	5J6-5	BRN-GRN	Solenoid 13 / 2J4-13
5J5-6	Key Pin	No Connection	5J6-6	---	No Connection
5J5-7	WHT-ORG	Solenoid 03C / 2J4-3	5J6-7	BRN-ORG	Solenoid 11 / 2J4-12
5J5-8	WHT-RED	Solenoid 02C / 2J4-2	5J6-8	BRN-RED	Solenoid 10 / 2J4-11
5J5-9	WHT-BRN	Solenoid 01C / 2J4-1	5J6-9	BRN-BLK	Solenoid 09 / 2J4-16
5J7-1	BLU-BLK	Solenoid 22	5J8-1	WHT-RED	Transformer: 26V ac / 7J2-6
5J7-2	BLU-GRN	Solenoid 21	5J8-2	WHT-RED	Transformer: 26V ac / 7J2-6
5J7-3	BLU-ORG	Solenoid 19	5J8-3	WHT-RED	Transformer: 26V ac / 7J2-7
5J7-4	Key Pin	No Connection	5J8-4	WHT-RED	Transformer: 26V ac / 7J2-7
5J7-5	BLU-YEL	Solenoid 20	5J8-5	Key Pin	No Connection
5J7-6	BLU-RED	Solenoid 18	5J8-6	BLK-YEL	Transformer: 48V ac / 7J2-11
5J7-7	BLU-BRN	Solenoid 17	5J8-7	BLK-YEL	Transformer: 48V ac / 7J2-11
5J9-1	---	No Connection	5J8-8	BLK-YEL	Transformer: 48V ac / 7J2-12
5J9-2	---	No Connection	5J8-9	BLK-YEL	Transformer: 48V ac / 7J2-12
5J9-3	Key Pin	No Connection			
5J9-4	WHT-BLU	Motor	5J10-1	BLK	Solnd Gnd / 1J13-1
5J9-5	---	No Connection	5J10-2	BLK	Solnd Gnd / 1J13-2
5J9-6	WHT-BLU	Motor	5J10-3	BLK	Solnd Gnd / 1J13-3
5J9-7	---	No Connection	5J10-4	BLK	Solnd Gnd / 1J13-4
5J12-1	---	No Connection	5J11-1	ORG	+25 Vdc "C" Solenoid Pwr/2J5-9
5J12-2	GRY-YEL	+50 Vdc Flipper Pwr/ 2J5-3	5J11-2	---	No Connection
5J12-3	---	No Connection	5J11-3	Key Pin	No Connection
5J12-4	BLU-YEL	+50 Vdc Flipper Pwr/2J5-2	5J11-4	BRN	+25 Vdc "A" Solenoid Pwr/2J5-12
5J12-5	---	No Connection	5J11-5	---	No Connection
5J12-6	VIO-YEL	+50 Vdc Solenoid Pwr/2J5-10	5J11-6	BLK	Ground/2J5-6
5J12-7	---	No Connection	5J11-7	---	No Connection
5J12-8	Key Pin	No Connection	5J11-8	---	No Connection
5J12-9	---	No Connection	5J11-9	RED	+25 Vdc Solenoid Pwr/2J5-8
5J12-10	---	No Connection	5J11-10	---	No Connection
5J12-11	YEL-VIO	+50 Vdc Solenoid Pwr/2J5-11	5J11-11	RED-WHT	+25 Vdc Solenoid Pwr/2J5-1
5J12-12	---	No Connection	5J11-12	---	No Connection

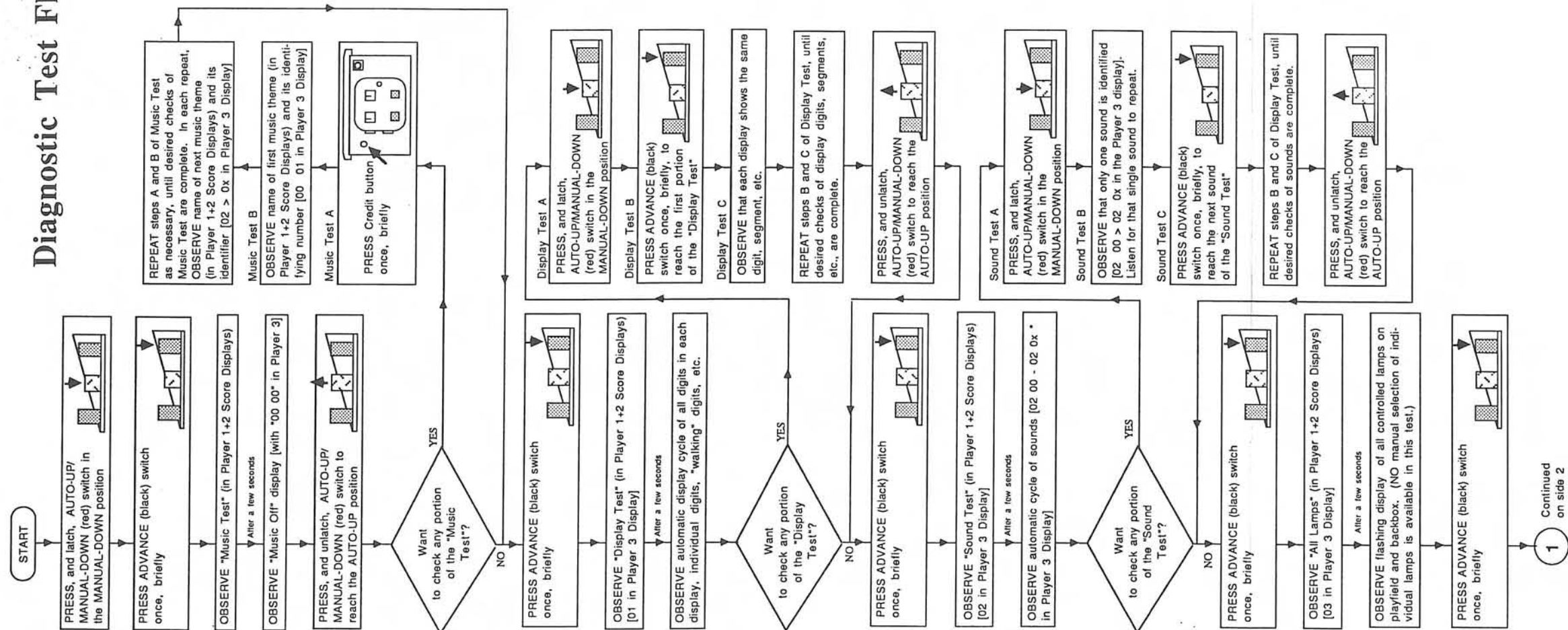
POWER SUPPLY INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
3J1-1	BLK	Ground / 11J3-2	3J2-1	ORG	Display Power: -100V dc / 4J7-1
3J1-2	BLK	Ground / 1J17-1	3J2-2	---	No Connection
3J1-3	BLK	Ground / 1J17-2	3J2-3	BRN	Display Power: +100V dc / 4J7-3
3J1-4	BLK	Ground / 1J17-3	3J2-4	---	No Connection
3J1-5	BLK-YEL	Logic Ground / 2J2-3	3J2-5	BLK	Ground (Display ckt) / 4J7-5
3J1-6	GRY	CPU Pwr: +5V dc Reg / 1J17-5	3J2-6	GRY	Display Power: +5V dc / 4J7-6
3J1-7	GRY	" / 1J13-1			
3J1-8	GRY	" / 1J17-4	3J3-1	GRY	Transformer: 19.4V ac, 1Ø, C. T.
3J1-9	GRY	" / 1J17-6	3J3-2	GRY	Transformer: 19.4V ac, 1Ø, C. T.
3J1-10	Key Pin	No Connection	3J3-3	GRY-WHT	Transformer: 19.4V ac, C.T. com
3J1-11	WHT-GRY	CPU Pwr: +12V dc Unreg / 11J3-6	3J3-4	GRY-WHT	Transformer: 19.4V ac, C.T. com
3J1-12	WHT-GRY	CPU Power: +12V dc Unreg / 1J17-9	3J3-5	GRY-GRN	Transformer: 19.4V ac, 1Ø, C. T.
3J1-13	GRY-YEL	CPU Power: +12V dc Unreg / 2J2-1	3J3-6	GRY-GRN	Transformer: 19.4V ac, 1Ø, C. T.
3J1-14	BLK-WHT	CPU Pwr: -12V dc Unreg / 1J17-8	3J3-7	Key Pin	No Connection
3J1-15	BLK-WHT	CPU Pwr: -12V dc Unreg / 11J3-3	3J3-8	WHT	Transformer: 88.5V ac
			3J3-9	WHT	Transformer: 88.5V ac

SYSTEM 11B CPU INTERBOARD SIGNALS

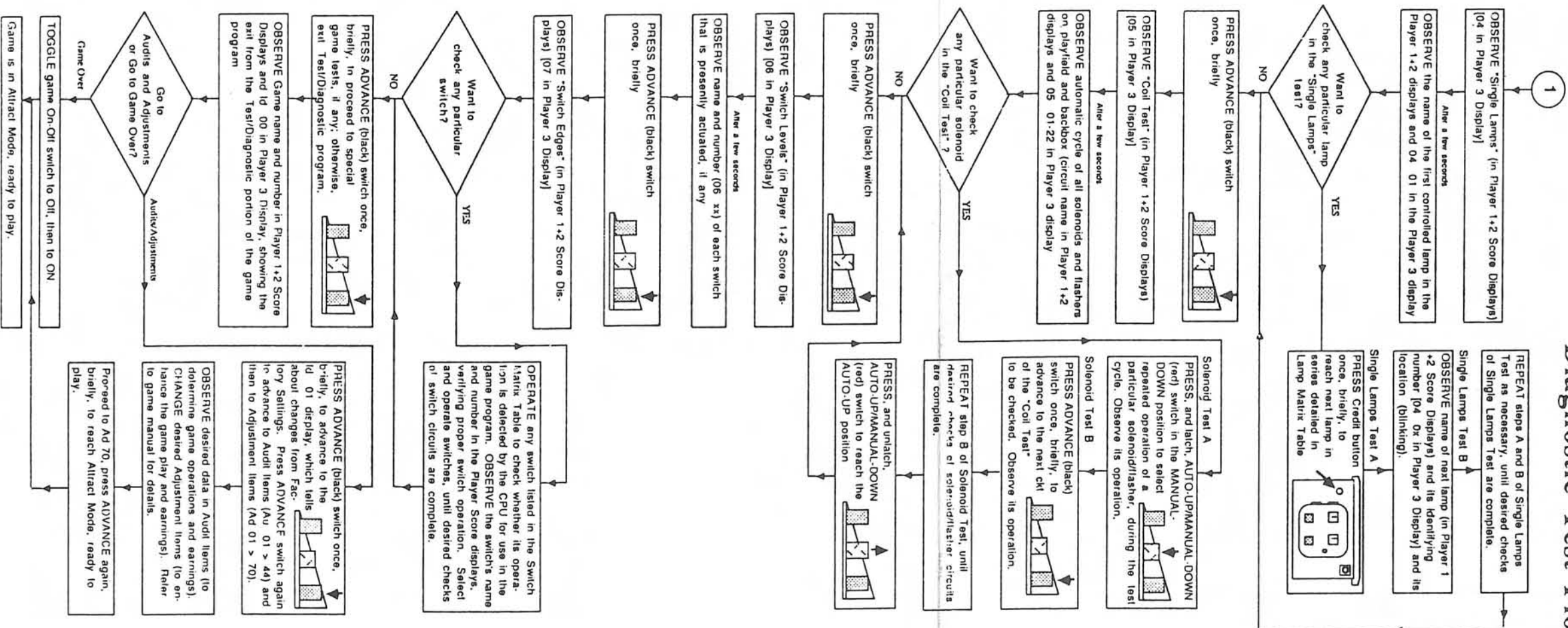
Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
1J1-1	BRN-GRY	ST-8: Display Digit Strobe / 4J1-1	1J2-1	VIO-GRY	ST-16: Display Digit Strobe / 4J2-1
1J1-2	BRN-VIO	ST-7: Display Digit Strobe / 4J1-2	1J2-2	VIO-BLK	ST-15: Display Digit Strobe / 4J2-2
1J1-3	BRN-BLU	ST-6: Display Digit Strobe / 4J1-3	1J2-3	VIO-BLU	ST-14: Display Digit Strobe / 4J2-3
1J1-4	BRN-GRN	ST-5: Display Digit Strobe / 4J1-4	1J2-4	VIO-GRN	ST-13: Display Digit Strobe / 4J2-4
1J1-5	BRN-YEL	ST-4: Display Digit Strobe / 4J1-5	1J2-5	VIO-YEL	ST-12: Display Digit Strobe / 4J2-5
1J1-6	BRN-ORG	ST-3: Display Digit Strobe / 4J1-6	1J2-6	VIO-ORG	ST-11: Display Digit Strobe / 4J2-6
1J1-7	BRN-RED	ST-2: Display Digit Strobe / 4J1-7	1J2-7	Key Pin	No Connection
1J1-8	Key Pin	No Connection	1J2-8	VIO-RED	ST-10: Display Digit Strobe / 4J2-8
1J1-9	BRN-BLK	ST-1: Display Digit Strobe / 4J1-9	1J2-9	VIO-BRN	ST-9: Display Digit Strobe / 4J2-9
1J3-1	BLU-BRN	D1 / Display BCD / 4J5-1	1J4-1	VIO	Lamp +18V dc Power
1J3-2	BLU-RED	C1 / Display BCD / 4J5-2	1J4-2	VIO	"
1J3-3	BLU-ORG	B1 / Display BCD / 4J5-3	1J4-3	Key Pin	No Connection
1J3-4	BLU-YEL	A1 / Display BCD / 4J5-4	1J4-4	---	No Connection
1J3-5	BLU-GRN	D2 / Display BCD / 4J5-5	1J4-5	---	No Connection
1J3-6	Key Pin	No Connection	1J4-6	---	No Connection
1J3-7	BLU-BLK	C2 / Display BCD / 4J5-7	1J4-7	---	No Connection
1J3-8	BLU-VIO	B2 / Display BCD / 4J5-8	1J4-8	VIO	Lamp +18V dc Power
1J3-9	BLU-GRY	A2 / Display BCD / 4J5-9	1J4-9	VIO	"
1J3-10	---	No Connection			
1J3-11	---	No Connection	1J6-1	RED-BRN	Lamp Row 1 (Q80) / 2J3-18
1J3-12	---	No Connection	1J6-2	RED-BLK	Lamp Row 2 (Q81) / 2J3-17
			1J6-3	RED-ORG	Lamp Row 3 (Q82) / 2J3-16
1J5-1	---	No Connection	1J6-4	Key Pin	No Connection
1J5-2	Key Pin	No Connection	1J6-5	RED-YEL	Lamp Row 4 (Q83) / 2J3-15
1J5-3	BLK	Ground (Lamp Ckt)	1J6-6	RED-GRN	Lamp Row 5 (Q84) / 2J3-14
1J5-4	BLK	Ground (Lamp Ckt)	1J6-7	RED-BLU	Lamp Row 6 (Q85) / 2J3-13
1J5-5	---	No Connection	1J6-8	RED-VIO	Lamp Row 7 (Q86) / 2J3-12
1J5-6	---	No Connection	1J6-9	RED-GRY	Lamp Row 8 (Q87) / 2J3-11
1J5-7	---	No Connection			
1J5-8	BLK	Ground (Lamp Ckt)	1J8-1	GRN-BRN	Switch Col 1 (Q45) / 2J1-18
1J5-9	BLK	Ground (Lamp Ckt)	1J8-2	GRN-RED	Switch Col 2 (Q49) / 2J1-17
			1J8-3	GRN-ORG	Switch Col 3 (Q44) / 2J1-16
1J7-1	YEL-BRN	Lamp Col 1 (Q65/66) / 2J3-8	1J8-4	GRN-YEL	Switch Col 4 (Q48) / 2J1-15
1J7-2	YEL-RED	Lamp Col 2 (Q63/64) / 2J3-7	1J8-5	GRN-BLK	Switch Col 5 (Q43) / 2J1-14
1J7-3	YEL-ORG	Lamp Col 3 (Q61/62) / 2J3-6	1J8-6	Key Pin	No Connection
1J7-4	YEL-BLK	Lamp Col 4 (Q59/60) / 2J3-5	1J8-7	GRN-BLU	Switch Col 6 (Q47) / 2J1-13
1J7-5	Key Pin	No Connection	1J8-8	GRN-VIO	Switch Col 7 (Q42) / 2J1-12
1J7-6	YEL-GRN	Lamp Col 5 (Q57/58) / 2J3-4	1J8-9	GRN-GRY	Switch Col 8 (Q46) / 2J1-11
1J7-7	YEL-BLU	Lamp Col 6 (Q55/56) / 2J3-3			
1J7-8	YEL-VIO	Lamp Col 7 (Q53/54) / 2J3-2	1J9	Not Applicable	
1J7-9	YEL-GRY	Lamp Col 8 (Q51/52) / 2J3-1			
1J10-1	WHT-GRY	Switch Row 8 / 2J1-8	1J11-1	GRY-BRN	Solenoid 1 (Q33) / 5J1-9
1J10-2	WHT-VIO	Switch Row 7 / 2J1-7	1J11-2	Key Pin	No Connection
1J10-3	WHT-BLU	Switch Row 6 / 2J1-6	1J11-3	GRY-RED	Solenoid 2 (Q25) / 5J1-7
1J10-4	Key Pin	No Connection	1J11-4	GRY-ORG	Solenoid 3 (Q32) / 5J1-6
1J10-5	WHT-GRN	Switch Row 5 / 2J1-5	1J11-5	GRY-YEL	Solenoid 4 (Q24) / 5J1-5
1J10-6	WHT-YEL	Switch Row 4 / 2J1-4	1J11-6	GRY-GRN	Solenoid 5 (Q31) / 5J1-4
1J10-7	WHT-ORG	Switch Row 3 / 2J1-3	1J11-7	GRY-BLU	Solenoid 6 (Q23) / 5J1-3
1J10-8	WHT-RED	Switch Row 2 / 2J1-2	1J11-8	GRY-VIO	Solenoid 7 (Q30) / 5J1-2
1J11-9	WHT-BRN	Switch Row 1 / 2J1-1	1J11-9	GRY-BLK	Solenoid 8 (Q22) / 5J1-1
1J12-1	BRN-BLK	Solenoid 9 (Q17) / 5J2-9	1J13-1	BLK	Solenoid Ground / 5J10-1
1J12-2	BRN-RED	Solenoid 10 (Q9) / 5J2-8	1J13-2	BLK	" / 5J10-2
1J12-3	Key Pin	No Connection	1J13-3	BLK	" / 5J10-3
1J12-4	BRN-ORG	Solenoid 11 (Q16) / 5J2-6	1J13-4	BLK	" / 5J10-4
1J12-5	BRN-YEL	Solenoid 12 (Q8) / 5J2-5			
1J12-6	BRN-GRN	Solenoid 13 (Q15) / 5J2-4	1J14-1	BLK-RED	Memory Protect / 7J1-4
1J12-7	BRN-BLU	Solenoid 14 (Q7) / 5J2-3	1J14-2	WHT	Ground / 7J1-3
1J12-8	BRN-VIO	Solenoid 15 (Q14) / 5J2-2	1J14-3	GRN	ADVANCE Switch / 7J1-1
1J12-9	BRN-GRY	Solenoid 16 (Q6) / 5J2-1	1J14-4	BLU	AUTO/MANUAL Switch / 7J1-2
1J16-1	RED	Volume Control Input / 11J1-1	1J17-1	BLK	Ground / 3J1-2
1J16-2	BLK	Volume Control Output / 11J1-2	1J17-2	BLK	" / 3J1-3
1J16-3	Key Pin	No Connection	1J17-3	BLK	" / 3J1-4
1J16-4	White	Signal Ground - CPU / 11J1-4	1J17-4	GRY	Power: +5V dc / 3J1-8
			1J17-5	GRY	" / 3J1-6
			1J17-6	GRY	" / 3J1-9
1J18-1	---	No Connection	1J17-7	Key Pin	No Connection
1J18-2	---	"	1J17-8	BLK-WHT	Power: -12V dc Unreg / 3J1-14
1J18-3	---	"	1J17-9	WHT-GRY	Power: +12V dc Unreg / 3J1-12
1J18-4	---	"			
1J18-5	---	"	1J19-1	ORG-VIO	Flipper Ground / 2J5-5
1J18-6	Key Pin	"	1J19-2	ORG-GRY	Flipper Ground / 2J5-4
1J18-7	---	"	1J19-3	BLU-ORN	Spl Solnd 3 (Q73) / 5J3-3
1J18-8	---	"	1J19-4	BLU-RED	Spl Solnd 2 (Q71) / 5J3-6
1J18-9	---	"	1J19-5	Key Pin	No Connection
			1J19-6	BLU-YEL	Spl Solnd 4 (Q69) / 5J3-4
1J21	Ribbon Cable to Audio Board 11J4		1J19-7	BLU-BRN	Spl Solnd 1 (Q75) / 5J3-7
1J22	Ribbon Cable to Master Display Board 4J3		1J19-8	BLU-GRN	Spl Solnd 5 (Q77) / 5J3-2
			1J19-9	BLU-BLK	Spl Solnd 6 (Q79) / 5J3-1

Diagnostic Test Flowchart



DIAGNOSTIC TEST FLOWCHART (SIDE 1)

Diagnostic Test Flowchart Side 2



MOUSIN' AROUND LAMP MATRIX

column	1 Q66	2 Q64	3 Q62	4 Q60	5 Q58	6 Q56	7 Q54	8 Q52
row	YEL-BRN 1J7-1	YEL-RED 1J7-2	YEL-ORN 1J7-3	YEL-BLK 1J7-4	YEL-GRN 1J7-6	YEL-BLU 1J7-7	YEL-VIO 1J7-8	YEL-GRY 1J7-9
1 Q80 RED-BRN 1J6-1	Shoot Again 1	C 9	M 17	T 25	Set Trap 1 33	Qualify Million 1 41	N 49	Jackpot 1 Million 57
2 Q81 RED-BLK 1J6-2	Set Trap 2 2	H 10	O 18	R 26	Playfield Multiply 34	Extra Ball 1 42	O 50	Jackpot 1.5 Million 58
3 Q82 RED-ORN 1J6-3	50 K 3	E 11	U 19	A 27	Spot Cheese 3 35	Spot Cheese 1 43	I 51	Jackpot 2 Million 59
4 Q83 RED-YEL 1J6-5	100 K 4	E 12	S 20	P 28	Kickback 36	Qualify Million 2 44	L 52	Jackpot 2.5 Million 60
5 Q84 RED-GRN 1J6-6	150 K 5	S 13	E 21	Left Center Target 29	Left Outlane 37	Extra Ball 2 45	L 53	Jackpot 3 Million 61
6 Q85 RED-BLU 1J6-7	200 K 6	E 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Spot Cheese 2 46	I 54	Jackpot 4 Million 62
7 Q86 RED-VIO 1J6-8	250 K 7	2X Bonus 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Right Stand-up Target 47	M 55	Jackpot 5 Million 63
8 Q87 RED-GRY 1J6-9	Jackpot 8	3X Bonus 16	Top Lanes Right 24	Double Plyd Value Timer 32	Right Outlane 40	Cheezy Bonus 48	Build Jackpot 56	Not Used 64

MOUSIN' AROUND SWITCH MATRIX

column	1 Q45	2 Q49	3 Q44	4 Q48	5 Q43	6 Q47	7 Q42	8 Q46
row	GRN-BRN 1J8-1	GRN-RED 1J8-2	GRN-ORN 1J8-3	GRN-YEL 1J8-4	GRN-BLK 1J8-5	GRN-BLU 1J8-7	GRN-VIO 1J8-8	GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Outhole 9	M 17	T 25	Trap 1 Up/Down 33	Trap 1 Ball 41	Ball Diverter 49	Right Flipper 57
2 WHT-RED 1J10-8	Not Used 2	Not Used 10	O 18	R 26	Trap 2 Up/Down 34	Trap 2 Ball 42	Motor Bank Down 50	Left Flipper 58
3 WHT-ORN 1J10-7	Credit Button 3	Trough 1 Right 11	U 19	A 27	Center Ramp 35	Motor Bank Up 43	Left Outlane 51	Mouse Hole Lock 1 59
4 WHT-YEL 1J10-6	Right Coin Chute 4	Trough 2 Middle 12	S 20	P 28	Playfield Multiply 36	Right Ramp Enter 44	Left Jet 52	Mouse Hole Lock 2 60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Trough 3 Left 13	E 21	Left Center Target 29	Left Ramp Exit 37	Not Used 45	Right Jet 53	Mouse Hole Lock 3 61
6 WHT-BLU 1J10-3	Left Coin Chute 6	Shooter Lane 14	Top Lanes Left 22	Middle Center Target 30	Left Return Lane 38	Right Ramp Exit 46	Bottom Jet 54	Not Used 62
7 WHT-VIO 1J10-2	Slam Tilt 7	Right Return Loop 15	Top Lanes Middle 23	Right Center Target 31	Right Return Lane 39	Left Ramp Enter 47	Left Sling 55	Not Used 63
8 WHT-GRY 1J10-1	High Score Rset 8	Left Return Loop 16	Top Lanes Right 24	Mouse Hole Enter 32	Right Outlane 40	Not Used 48	Right Sling 56	Not Used 64

WARNINGS & NOTICES

WARNING

FOR SAFETY AND RELIABILITY, substitute parts and equipment modifications are not recommended.

USE OF NON-BALLY PARTS or circuit modifications may cause injuries or equipment damage.

SUBSTITUTE PARTS OR MODIFICATIONS may void FCC Type Acceptance.

THIS GAME IS PROTECTED by Federal copyright, trademark and patent laws. Unauthorized software or hardware modifications may be illegal under Federal law.

THIS "MODIFICATION" PRINCIPLE ALSO APPLIES to unauthorized facsimiles of BALLY logos, designs, publications, and assemblies. Moreover, facsimiles of BALLY equipment (or any feature thereof) may be illegal under Federal law. Whether or not such facsimiles are manufactured with BALLY components, this rule applies.

WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

WARNING

Transport this game **ONLY** with hinged backbox down!

WARNING

FCC STICKER. Check the back of your game for an FCC sticker. When BALLY ships a game, the game has been found to comply with FCC Rules. The sticker is proof. If the sticker is missing, legal repercussions to the owner and distributor of the game may result. If your game (manufactured after December 1982) has no FCC sticker, call BALLY for advice. Or write us a note on your game-registration card. Be sure the card bears your game's serial number.

WARNING

THREE-WIRE PLUG. Prevent shock hazard and assure proper game operation! Only plug this game into a properly grounded outlet. **DO NOT** use a "cheater" plug to defeat the power cord's ground pin. **DO NOT** cut off the ground pin.

RF-INTERFERENCE NOTICE

YOUR GAME'S CABLE-HARNESS PLACEMENT and ground-strap routing are very important. They are designed to keep RF radiation and conduction within levels accepted by FCC Regulations.

MAINTAIN THESE LEVELS. Servicing may require that you disconnect harnesses or ground straps. When you're finished, reposition and reconnect them as they were.

NOTICE

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