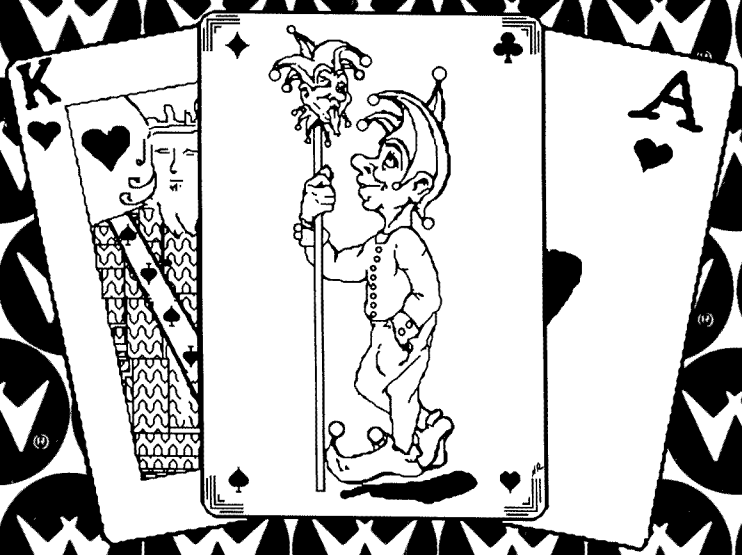
JOKERZ!



OPERATIONS MANUAL

including

- Game Operation
- Test/Diagnostic Procedures
- Parts Information
- Reference Diagrams & Schematics

JOKERZ ROM and Jumper Table

Game	System 11B CPU Rev.	P/N - U15 Game µP	P/N - U27 G. ROM 1	P/N - U26 G. ROM 2	P/N - U21 S. ROM 1	P/N - U22 S. ROM 2	P/N - U24 Sound µP	Jumpers
BIG GUNS	-	5400-09150-00	A-5343-557-2	A-5343-557-1	A-5343-557-4	A-5343-557-3	5400-09150-00	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
SPACE STATION	-		A-5343-552-2	A-5343-552-1	A-5343-552-4	A-5343-552-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
CYCLONE	-		A-5343-564-2	A-5343-564-1	A-5343-564-4	A-5343-564-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
BANZAI RUN	-		A-5343-566-2	A-5343-566-1	A-5343-566-4	A-5343-566-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
SWORDS OF FURY	-		A-5343-559-2	A-5343-559-1	A-5343-559-4	A-5343-559-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
TAXI	-		A-5343-553-2	A-5343-553-1	A-5343-553-4	A-5343-553-3		W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19
JOKERZ	-	▼	A-5343-567-2	A-5343-567-1	A-5343-567-4	A-5343-567-3	▼	W1, 2, 4, 5, 7, 8, 11, 14, 16, 17, and 19

JOKERZ Solenoid Table

Sol. No.	Function	Solenoid Type	Wire [1] Color	Connections: CPU Bd	Connections: Playfield/ Cabinet	Driver Trnstr	Solenoid Part Number / Flashlamp Type (i=Insert Bd; p=Playfield)
01A [3]	Outhole Kicker	Switched	{Vio-Brn	1P11-1	5J1-9; 5J4-9 (A)	Q33	AE-23-800
01C [3]	Left UPF/"JO" (I) Flashers	Switched	Blk-Brn}	(Gry-Brn)	5J5-9 (C)	Q33	#906/#89 flashlamps 1p,1i
02A [3]	Ball Release (Shtr Lane Feeder)	Switched	{Vio-Red	1P11-3	5J1-7; 5J4-8 (A)	Q25	AE-23-800
02C [3]	UPF/"KE" (I) Flashers	Switched	Blk-Red}	(Gry-Red)	5J5-8 (C)	Q25	#906/#89 flashlamps 1p,1i
03A [3]	Bottom Left 3-Bank Dr Tgt	Switched	{Vio-Orn	1P11-4	5J1-6; 5J4-7 (A)	Q32	AE-26-1200
03C [3]	UPF/"RZ" (I) Flashers	Switched	Blk-Orn}	(Gry-Orn)	5J5-7(C)	Q32	#906/#89 flashlamps 1p,1i
04A [3]	Bottom Right 3-Bank Dr Tgt	Switched	{Vio- Yel	1P11-5	5J1-5; 5J4-6 (A)	Q24	AE-26-1200
04C [3]	Right UPF/"I" (I) Flashers	Switched	Blk-Yel}	(Gry-Yel)	5J5-5 (C)	Q24	#906/#89 flashlamps 1p,1i
05A [3]	Top Left Kicker	Switched	{Vio-Grn	1P11-6	5J1-4; 5J4-5 (A)	Q31	AE-23-800
05C [3]	DOUBLE SCORE (I) Flashers	Switched	Blk-Grn}	(Gry-Grn)	5J5-4 (C)	Q31	#89 flashlamps 3i
06A [3]	Top Left 3-bank Dr Tgt	Switched	{Vio-Blu	1P11-7	5J1-3; 5J4-4 (A)	Q23	AE-26-1200
06C [3]	TL Dr Tgt/Top Jokers (I) Flashers	Switched	Blk-Blu}	(Gry-Blu)	5J5-3 (C)	Q23	#906/#89 flashlamps 1p,1i
07A [3]	Bottom Left Locking Kicker	Switched	{Vio-Blk	1P11-8	5J1-2; 5J4-2 (A)	Q30	AE-26-1500
07C [3]	BL Dr Tgt/Mid Jokers (I) Flashers	Switched	Blk-Vio}	(Gry-Vio)	5J5-2 (C)	Q30	#906/#89 flashlamps 1p,1i
08A [3]	Knocker	Switched	{Vio-Gry	1P11-9	5J1-1; 5J4-1 (A)	Q22	AE-26-1200
08C [3]	BR Dr Tgt/Lwr Jokers (I) Flashers	Switched	Blk-Gry}	(Gry-Blk)	5J5-1 (C)	Q22	#906/#89 flashlamps 1p, 1i
09	On Cntr Ramp/Jackpot (I) Flasher	Controlled	Brn-Blk	1P12-1	5J2-9; 5J6-9; 2J4-3	Q17	#906/#89 flashlamp 2p, 1i
10	Playfield/Insert Gnl Illum Relays	Controlled	Brn-Red	1P12-2	5J2-8; 5J6-8; 2J4-5	Q9	5580-12145-01 [4]
11	Wheel (I) Flashers	Controlled	Brn-Orn	1P12-4	5J2-6; 5J6-7; 2J4-6	Q16	#89 flashlamps 4i
12	A/C Select Relay	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01 [5]
13	Wheel Coil B (I)	Controlled	Brn-Grn	1P12-6	5J2-4; 5J6-5	Q15	14-7948
14	Wheel Coil A (I)	Controlled	Brn-Blu	1P12-7	5J2-4; 5J6-3	Q7	14-7948
15	Cntr Ramp Motor	Controlled	Brn-Vio	1P12-8	5J2-2; 5J6-2	Q14	14-7944
16	TR Eject	Controlled	Brn-Gry	1P12-9	5J2-1; 5J6-1	Q6	AE-23-800
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	In Cntr Ramp Flasher	Special #6	Blu-Blk	1P19-9	5J3-1; 5J7-1	Q79	#906 flashlamp 2p
-	Right Flipper	-	Orn-Vio	1P19-1	2J3-1; 2J18-10; 7P1-15	-	
	Lower Right Flipper		[Blu-Vio] [2]		[7P1-16; 2J18-6; 2J17-4]		FL11630/50VDC
-	Left Flipper	-	Orn-Gry	1P19-2	2J3-2; 2J18-9; 7P1-18	-	
	Lower Left Flipper		[Blu-Gry] [2]		[7P1-19,2J18-5;2J17-3]		FL11630/50VDC

Notes: 1. Wire colors, except flipper Orn-Vio and Orn-Gry, are ground connections (to coil terminal with unbanded end of diode). Flipper Orn-Vio and Orn-Gry wires connect from CPU Board to flipper switch. 2. Flipper connections shown in braces are from flipper switch to flipper coil. 3. "A" 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, p/n C-11998-1. 5. Relay is mounted on Aux Power Driver Bd, D-12247 in the backbox.

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Section 1
Game Operation & Test Information

- JOKERZ (System 11B) ROM Summary
- Pinball Game Assembly Instructions
- Game Play
- Game Status Displays
- Game Adjustment Procedure
- Game Pricing
- Test/Diagnostic Procedures

JOKERZ (System 11B) ROM Summary

IC	DESCRIPTION	TYPE	IDENTIFIER	BOARD	PART NUMBER
Game ROM 1	32K x 8 ROM	27256	U27	CPU	A-5343-567-2
Game ROM 2	32K x 8 ROM	27256	U26	CPU	A-5343-567-1
Sound ROM 1	32K x 8 ROM	27256	U21	CPU	A-5343-567-4
Sound ROM 2	32K x 8 ROM	27256	U22	CPU	A-5343-567-3
Music/Speech ROM	64K x 8 ROM	27512	U5	Audio	A-5343-567-5

NOTICE

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

CONNECTOR & COMPONENT IDENTIFICATION

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

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., connector 1J1).

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

JOKERZ CIRCUIT BOARDS

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

The Master Display Board is mounted on the back of the Speaker/Display Panel, just below the Insert Board. To access the Master Display Board, carefully lift the Speaker/Display Panel out of its bottom guide and lay it forward onto the top of the game cabinet.

Lamp circuit boards are mounted on the Playfield, the Insert Board, and on top of the Backbox under the JOKERZ Dome.

CPU BOARD. The System 11B CPU Board (p/n D-11883-567) must be equipped with the ROMs specified in the **JOKERZ** (System 11B) ROM Summary. CPU Board jumpers W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, and W19 must be connected.

AUDIO BOARD. The Audio Board is p/n D-12338-567, including ROMs and microprocessor.

DISPLAY BOARD. The Alphanumeric Display Unit Board is p/n D-12232-1.

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

AUX POWER DRIVER BOARD. The Aux Power Driver Board is D-12247-559.

MASTER INTERCONNECT BOARD. The Master Interconnect Board is D-12313-567.

Figure 1 shows the locations of these circuit boards, as well as other devices especially located to make **JOKERZ** a great game.

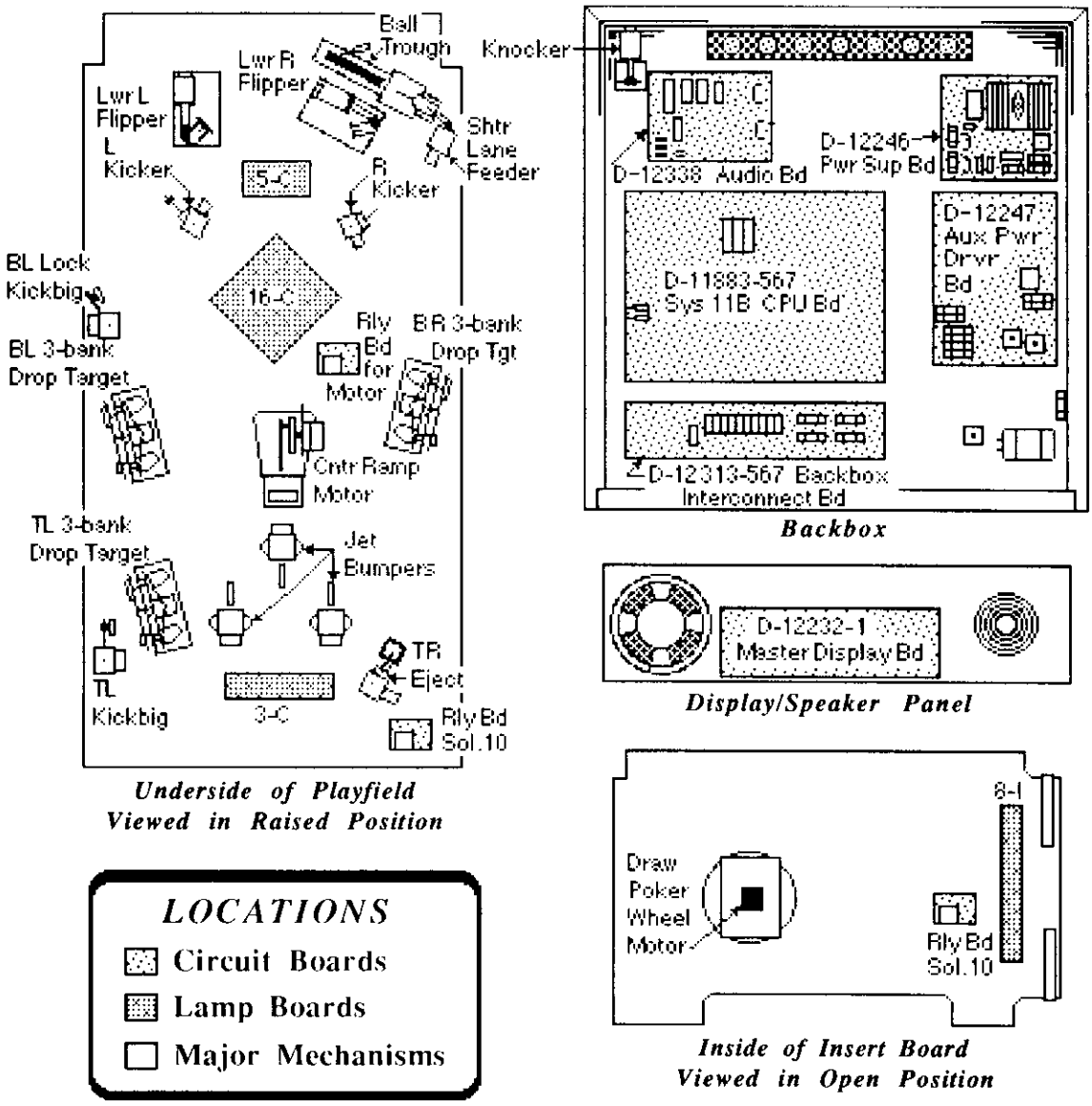


Figure 1. Locations Diagram - Game Circuit Boards and Major Mechanisms

JOKERZ 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 Backbox portion of Figure 1 on the CPU Board).

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. **JOKERZ** 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.

Figure 1 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.

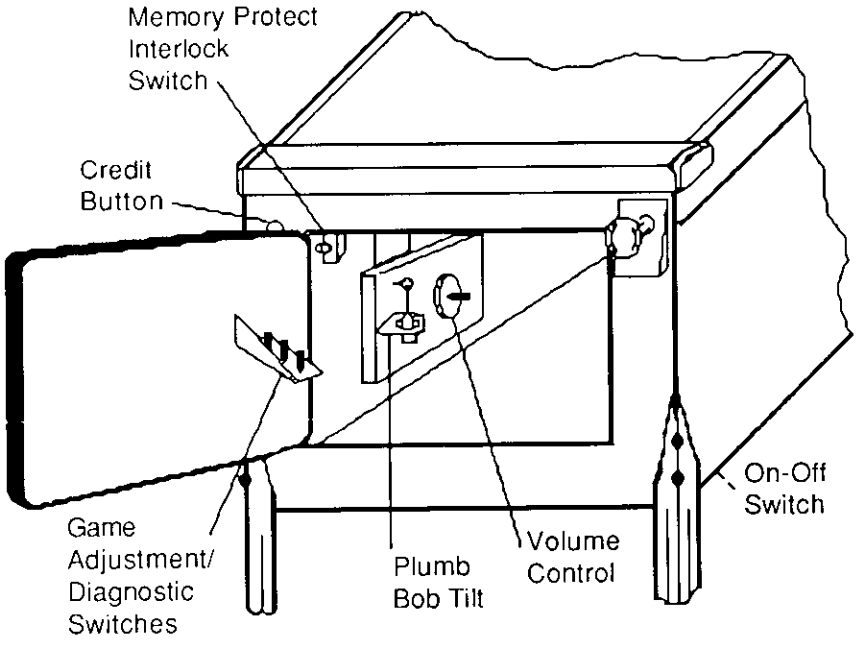


Figure 2. Pinball Game Controls Locations

PINBALL GAME ASSEMBLY INSTRUCTIONS

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

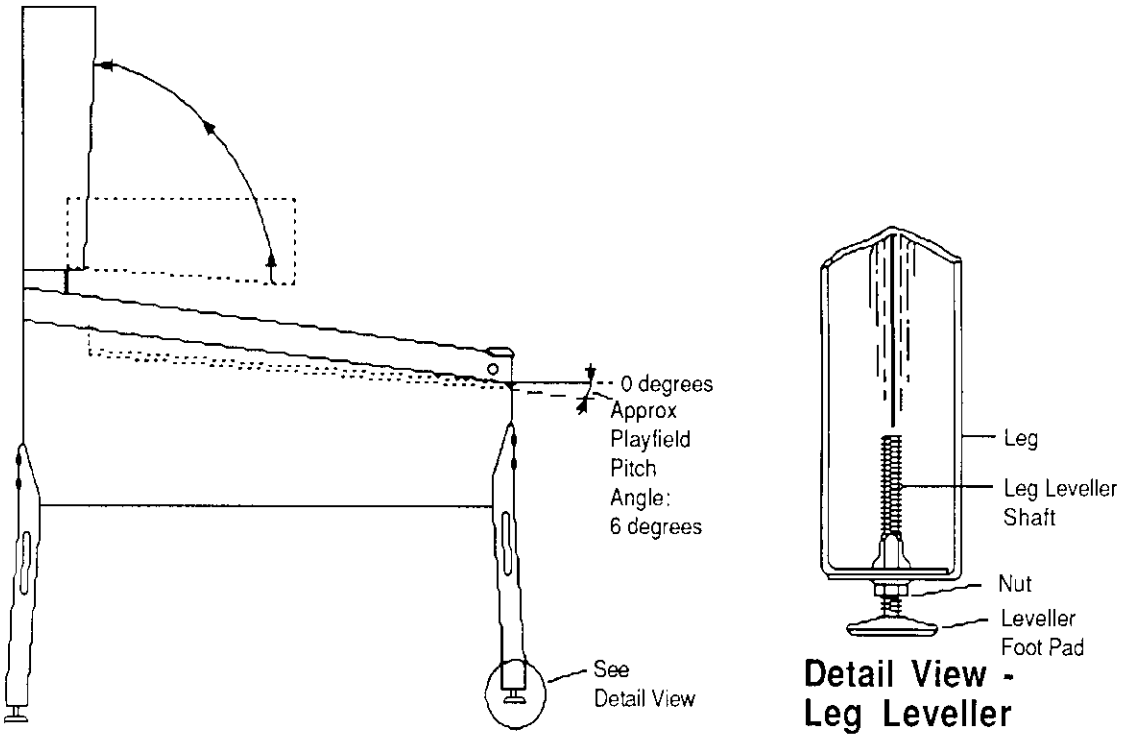


Figure 3. Pinball Assembly, Playfield Pitch Angle, and Leg Leveller Details.

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

CAUTION

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

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

WARNING

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

6. 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.

PINBALL GAME ASSEMBLY INSTRUCTIONS (Continued)

7. Adjust the leg levellers for proper playfield level (side-to-side) *and* playfield pitch angle (incline) of approximately 6 degrees. (Again, it is recommended that these measurements be made ON the playfield, not the cabinet nor the playfield cover glass.) Tighten the nut on each leg leveller shaft to maintain this setting, as shown in Figure 3.

CAUTION

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

8. Move the game into the desired location; recheck the level and pitch angle of the playfield.
9. Verify that the ***required number*** of balls are installed in the game. (**JOKERZ**: 3 balls.)
10. 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 (≈ 30 games). However, the game program compensates the game play requirements affected by each disabled switch to allow 'nearly normal' play. This helps keep **JOKERZ** earning good profits! More information is available in the Test/ Diagnostic Procedures text describing the Switch Testing.

GAME OPERATION (Continued)

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

A. Recent highest scores*;
B. A "custom message"
("**DOUBLE YER SCORE ... AND SO MUCH MORE ... WITH JOKERZ**")*;
C. The score to achieve to obtain a Replay award*;

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

CREDIT POSTING. Insert coin(s). A sound is heard for each coin, and the player score displays show the number of credits purchased. So long as the number of maximum allowable credits* are *NOT* exceeded by coin purchase or high score, credits are posted correctly. However, after this maximum credits value is reached, posting of additional credits won (not purchased) by the player does *not* occur. ONLY posting of *purchased* credits occurs beyond the maximum credits value.

STARTING A GAME. Press the Credit button once. A startup sound plays, and the Credit amount shown in the player score display decreases by one. Player display 1 flashes 00 (until the first playfield switch is actuated), and the Player 4 display shows **ball 1**, except for 4-player games where the **ball #** shows in the individual player's display. Additional players may enter the game by pressing the Credit button once for each player, before the end of play on the first ball.

TILT. Actuating the Slam Tilt switch on the coin door inside the cabinet ends the current game; JOKERZ 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

JOKERZ GAME STATUS DISPLAYS

JOKERZ provides the game owner/operator with a display of information concerning the game's bookkeeping and game play feature adjustments. Basically, three classes of information now become available in this status display mode: Id (Identification); Au (Audit); Ad (Adjustment). Each of the underscored two-letter abbreviations for these classes appears in the Player 3 score display, while the system microprocessor for the **JOKERZ** 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
JOKERZ	**Id 00**	**567**	**L-x***

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

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

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

Audit Information--Au

While the AUTO-UP switch remains in the Up position, the operator can press the ADVANCE switch once, briefly, to begin the backbox displays of Audit (sometimes called "bookkeeping") Information. Fifty-one 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 **JOKERZ Audit Table** lists the 51 items of the Audit Information portion of the **JOKERZ** 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 49 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.)

JOKERZ GAME STATUS DISPLAYS (Continued)

JOKERZ Audit Table

Audit Item (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Audit Factor [1] Value (Player 4)
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 PLAYR. GAMES	
28	BURN IN CYCLES	
29	JACKPOT AWARDS (# of times "Jackpot" was awarded)	
30	1 MILLION AWARDS (# of "1 Million" shot awards)	
31	DOUBLE YER SCORE (# of "Double Yer Score" shot awards)	
32	MULTIBALLS (# of times for Multi-Ball™ play)	
33	EJECT'S SPECIAL (# of times Eject awarded Special)	
34	LANE EX. BALLS (# of Ex. Ball awards via Out or Return Lanes)	
35	ADVANCE X'S (# of times Bonus Multiplier advanced)	
36	EXTRA BALL LIT (# of times Ex. Ball was lit by Bonus Multiplier)	
37	BELLS COMPLETED (# of Ace - Ten completions for Special)	
38	SPECIAL LIT (# of times 5th Bell lit Special)	
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	2.0-2.4 MIL. SCORE (# of games ≥2.0M, <2.5M)	
45	2.5-2.9 MIL. SCORE (# of games ≥2.5M, <3.0M)	
46	3.0-99.9 MIL. SCORE (# of games ≥3.0M, <99.9M)	
47	H.S.T.D. 1> ??? (1st in HSTD Table, w/Initials)	
48	H.S.T.D. 2> ??? (2nd in HSTD Table, w/Initials)	
49	H.S.T.D. 3> ??? (3rd in HSTD Table, w/Initials)	
50	H.S.T.D. 4> ??? (4th in HSTD Table, w/Initials)	
51	AV. MIN. GAME TIME (Avg Game Time in minutes)	
52	LEFT DRAINS (# of drains via Left Outlane)	
53	RIGHT DRAINS (# of drains via Right Outlane)	
54	MILLION LIT (# of times "1 Million" shot was lit)	
55	CONSOL. EX. BALLS (# of Consolation Extra Balls awarded)	

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.

JOKERZ GAME STATUS DISPLAYS (Continued)

JOKERZ Game Adjustment Table

Adjustment Item (Player 3)	Descriptive Phrases (Player 1 and 2 Displays)	Factory Setting (Player 4)
Ad 01	AUTO REPLAY [1] *or* FIXED REPLAY [1]	10 (%) SCORES [1]
02	REPLAY START (or REPLAY LEVEL 1) [1]	2,500,000
03	REPLAY LEVELS (or REPLAY LEVEL 2) [1]	01 (or OFF)
04	(REPLAY LEVEL 3) [1]	(see text)
05	(REPLAY LEVEL 4) [1]	(see text)
06	REPLAY AWARD	Credit
07	SPECIAL AWARD	Credit
08	MATCH FEATURE [Off, 1-50%]	10 (%)
09	NOT USED	-
10	TILT WARNING	03
11	EX. BALL / B. I. P. { [00 = NO Ex. Ball; 1-9 E. B. /Ball; 1-9 E. B. /B. I. P.; 1-9 E. B. /Game] }	3/BIP
12	MAXIMUM CREDITS	10
13	HIGHEST SCORES	On
14	BACKUP HI. SCR.1	5,000,000
15	BACKUP HI. SCR. 2	4,500,000
16	BACKUP HI. SCR. 3	4,000,000
17	BACKUP HI. SCR. 4	3,500,000
18	HI. SCR.1 CREDITS	01
19	HI. SCR.2 CREDITS	01
20	HI. SCR.3 CREDITS	01
21	HI. SCR.4 CREDITS	01
22	H. S. RESET EVERY	3,000
23	FREE PLAY	NO
24	U.S.A. 1 COINAGE (1 COIN 1 PLAY) [2,3,6]	
25	LEFT UNITS	01
26	CENTER UNITS	04
27	RIGHT UNITS	01
28	UNITS/ CREDIT	01
29	UNITS/ BONUS	00
30	MINIMUM UNITS	00
31 - 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	Game-specific Adjustments (detailed in text and the Game Adjustment Setting Comparison Table)	
53 -58 [5,6]	Special Adjustments- See text for 53-58 details.	
59 [5]	INSTALL ADDABALL	NO
60 [5]	NOT USED	-
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:

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

JOKERZ GAME STATUS DISPLAYS (Continued)

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

The **JOKERZ 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. "Fine-tuning" of the game's Adjustment Items is a key feature of Williams Electronic Games products.

JOKERZ Game Adjustment Setting Comparison Table

American & French Games							
Adj #	Adj Description	Extra Easy Ad 62	Easy Ad 63	Medium (Factory) Ad 64	Hard Ad 65	Extra Hard Ad 66	Not Applicable
33	MILLION Timer	15 sec	15 sec	12 sec	10 sec	8 sec	8 sec
34	2X SCORE Timer	OFF	OFF	OFF	20 sec	10 sec	10 sec
35	DBL YER SCORE Timer	25 sec	25 sec	20 sec	20 sec	15 sec	10 sec
36	CARD Memory	Yes	Yes	Yes	No	No	No
37	BELL Memory	Yes	Yes	Yes	Yes	No	No
38	Ex. Ball Memory	Yes	Yes	Yes	Yes	Yes	No
39	NEXT GAME Memory	Yes	Yes	Yes	Yes	Yes	Yes
40	SUIT Memory	Yes	Yes	No	No	No	No
41	DROP TGT Memory	Yes	Yes	Yes	Yes	No	No
42	MULTI-BALL Difficulty	Easy	Easy	Easy	Medium	Medium	Hard
43	JACKPOT Difficulty	Easy	Easy	Medium	Medium	Medium	Hard
44	JACKPOT Advance	20,000	10,000	5,000	5,000	5,000	5,000
45	LITE EX. BALL at	4X	4X	4X	5X	6X	7X
46	LITE SPECIAL in	3 Bells	3 Bells	4 Bells	4 Bells	5 Bells	5 Bells
47	Ex. Ball Percent	50%	50%	33%	33%	33%	33%
48	SPECIAL Percent	5%	5%	5%	5%	5%	5%
Adj #	Adj Description	Not Applicable	Extra Easy Ad 62	Easy Ad 63	Medium (Factory) Ad 64	Hard Ad 65	Extra Hard Ad 66
German & European Games							

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; some also use the flipper button(s). *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* **JOKERZ 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. **JOKERZ** 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. **JOKERZ** 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 Protection circuit or closing the coin door will cause the message "ADJUST FAILURE" to appear.) Press ADVANCE once more to return to the Game-Over Mode.

GAME ADJUSTMENT PROCEDURE (Continued)

Details of Adjustment Items 01 through 70

01 Auto Replay (or Fixed Replay)
Of the two options, AUTO REPLAY is the 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). **JOKERZ** 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, **JOKERZ** 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. **JOKERZ** 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. **JOKERZ** 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 NOT USED

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 Extra Ball/Ball In Play

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

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

GAME ADJUSTMENT PROCEDURE (Continued)

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.

NOTE

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

13 Highest Scores

The operator can 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* through *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*.

GAME ADJUSTMENT PROCEDURE (Continued)

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 23 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).

GAME ADJUSTMENT PROCEDURE (Continued)

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 coin. The choices 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 CONTEST GAME?

The operator can specify (via the Credit button) that the game is set for contest or tournament play. Contest games are identical from game to game (but not necessarily from player to player). This has the effect of disabling all automatic percentaging and fixing the JACKPOT value at 4 Million. Also, the Draw Poker feature awards Extra Balls and Specials at 1/2 the normal percentage (minimum 1%) set by Adjustments 45 and 47. The choices are:

Yes - The game is set for use in a contest or tournament.
No - The game is set for normal play.

33 MILLION TIMER

The operator can choose (via the Credit button) the Time Limit for flashing the "1 Million" shot lamp; the flashing starts after the player drops all targets on all three Drop Target banks. (To collect the 1 Million award, the player must make all three targets on any of the three Drop Target banks within the time limit.) The range of this setting is *4 seconds* (Conservative) through *99 seconds* (Liberal).

34 2X SCORE TIMER

The operator can choose (via the Credit button) the Time Limit for lighting the Double Score lamp (doubling all playfield scores) during Multi-Ball™ play. The range of this setting is *1 second* (Conservative) through *99 seconds* (Liberal), or *OFF* (Super Liberal), which just lights the lamp until the end of Multi-Ball™ play.

35 DBL. YER SCORE T.

The operator can specify (via the Credit button) the Time Limit for the DOUBLE YER SCORE feature. At the start of every last ball, each player can double his current score once; however, for each Million points, 5 seconds is deducted from this time (keeping10 seconds as a minimum). The range of this setting is *1 second* (Conservative) through *99 seconds* (Liberal), or *OFF* (Super Liberal), which disables this feature.

36 CARDS MEMORY

The operator can choose (via the Credit button) whether the lighted lamps for the Ace - 10 cards are stored in memory for 'next ball' play. NOTE: This adjustment option affects the awarding of the Special. The choices are:

Yes - (Liberal) Any lit Ace - 10 lamps are stored in memory for recall during player's next ball.
No - (Conservative) Lamps are Off at each ball start.

37 BELL MEMORY

The operator can choose (via the Credit button) whether the Court Jester's Bells lamps are stored in memory for 'next ball' play. NOTE: This adjustment option affects the awarding of the Special. The choices are:

Yes - (Liberal) Any lit lamps are stored in memory for recall during player's next ball.
No - (Conservative) Lamps are Off at each ball start.

38 EX. BALL MEMORY

The operator can choose (via the Credit button) whether the four Extra Ball lamps (Left and right Return and Out Lanes) are stored in memory for 'next ball' play. The choices are:

Yes - (Liberal) Any lit Ex. Ball lamps are stored in memory for recall during player's next ball.
No - (Conservative) Lamps are Off at each ball start.

39 NEXT GAME MEMORY

The operator can choose (via the Credit button) whether certain Game Adjustment features remain at their progressive levels of difficulty for 'next game' play. The choices are:

Yes - Awarding of any credits from game play is stored in memory; slightly more difficulty in game play is automatically provided by the game program for 'next game' play.
No - Each game begins with an identical level of difficulty in game play.

40 SUIT MEMORY

The operator can choose (via the Credit button) whether the lighted Card Suit (Hearts - Spades - Clubs - Diamonds) lamps are stored in memory for recall during later play. NOTE: This adjustment option affects the awarding of the JACKPOT. The choices are:

Yes - (Liberal) Any lit Suit lamps are stored in memory for recall during player's next ball.
/M. Ball - Lamps are off at the end of a ball.
No - (Conservative) Lamps are Off at the end of Multi-Ball™ play.

41 DROP TARGET MEMORY

The operator can choose (via the Credit button) whether the lighted drop target '1 Million' lamps are stored in memory for 'next ball' play. NOTE: The setting affects the award of the '1 Million' shot. The choices are:

Yes - (Liberal) Any lit 1 Million lamps are stored in memory for recall during player's next ball.
No - (Conservative) Lamps are Off at the start of each ball.

42 MULTI-BALL™ DIFFICULTY

The operator can select (via the Credit button) the degree of difficulty to reach Multi-Ball™ play. NOTE: This adjustment affects award of the JACKPOT and the Playfield Double Score features. The choices are:

Easy - (Liberal) "Locks" (balls locked in kickbigs) are saved from game to game.
Medium - "Locks" are cleared at the end of each game.
Hard - The Ramp lowers itself at the end of each ball's play.

43 JACKPOT DIFFICULTY

The operator can select (via the Credit button) the degree of difficulty to light the Suit lamps during Multi-Ball™ play. NOTE: This adjustment affects award of the JACKPOT and the Playfield Double Score feature. The choices are:

Easy - (Liberal) The Ramp is always up during Multi-Ball™ play."
Medium - The Ramp is always up for the first JACKPOT; however, award of a Suit lowers the Ramp.
Hard - The Ramp always lowers itself when a Suit is awarded.

44 JACKPOT ADVANCE

The operator can choose (via the Credit button) how many points are added to the JACKPOT when the player gets an Ace, King, Queen, Jack or 10 card. The range of this setting is from *1,000* (Conservative) through *99,000* (Liberal).

GAME ADJUSTMENT PROCEDURE (Continued)

45 LITE EX. BALL at ___

The operator can choose (via the Credit button) the degree of difficulty for lighting the Extra Ball lamp from the flashing Bonus Multiplier lamp. The range of this setting is *2X* (Liberal) through *7X* (Conservative), and *NO X*, to disable this feature.

46 LITE SPECIAL in __

The operator can choose (via the Credit button) the degree of diffiiculty necessary to obtain the Special award. This adjustment controls how many lighted Court Jester Bells are required to light the SPECIAL lamp. The range of this setting is from *1 BELL* (Liberal) through *5 BELLS* (Conservative).

47 EXTRA BALL PERCENT

The operator can choose (via the Credit button) the percentage value for all Extra Balls. The range of this adjustment setting is *Enabled 1%* (Conservative) through *99%* (Extremely Liberal). (At 1%, any average of 1 Extra Ball will be awarded for each 100 games; at 99%, 99 Extra Balls will be awarded during 100 games.) This adjustment can also stop the Draw Poker feature from awarding Extra Balls, via a setting of *0 (Off)*.

48 SPECIAL PERCENT

The operator can choose (via the Credit button) the percentage value for all Specials. The range of this adjustment setting is *Enabled 1%* (Conservative) through *99%* (Extremely Liberal). (At 1%, any average of 1 Special will be awarded for each 100 games; at 99%, 99 Specials will be awarded during 100 games.) This adjustment can also stop the Draw Poker feature from awarding Specials, via a setting of *0 (Off)*.

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 3-line message provided is:

DOUBLE YER SCORE ... AND SO MUCH MORE ... WITH JOKERZ.

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. The game program does not allow entirely blank lines to be displayed.

GAME ADJUSTMENT PROCEDURE (Continued)

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 CONSOL. TIME

The operator can choose (via the Credit button) the lower limit of game time. 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 JOKERZ, an 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 lamp is not lit, because there is no minimum game time limit); *1 second* (Conservative) through *99 seconds* (Liberal). NOTE: A suggested time value for this adjustment is 1/3 the desired game time.

52 BACKGROUND VOLUME

The operator can choose (via the Credit button) how loud the Background Tune will play. The range of this setting is *00* (Loudest) through *15* (Softest). NOTE: This setting does NOT affect the loudness of the game sound effects. The Factory Setting is 06.

53 - 58 Not Used in USA Games (Refer to Game Adjustments for German Games)

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.

GAME ADJUSTMENT PROCEDURE (Continued)

SPECIAL PRESET ADJUSTMENTS CAUTION (Continued)

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.

JOKERZ Preset Game Adjustments Table for German Games

Adj #	Adj Description	German Ad 1 53	German Ad 2 54	German Ad 3 55	German Ad 4 56	German Ad 5 57	German Ad 6 58
01	Auto Replay	10%	10%	10%	10%	10%	10%
02	Replay Start	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000
03	Replay Level 2	02	02	02	02	02	02
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
12	Max. Credits	30	30	30	30	30	30
14	Backup High Score 1	7.000.000	7.000.000	00	7.000.000	7.000.000	00
15	Backup High Score 2	6.500.000	6.500.000	00	6.500.000	6.500.000	00
16	Backup High Score 3	6.000.000	6.000.000	00	6.000.000	6.000.000	00
17	Backup High Score 4	5.500.000	5.500.000	00	5.500.000	5.500.000	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
22	High Score Reset	1000 spiele	1000 spiele	1000 spiele	1000 spiele	1000 spiele	1000 spiele
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 through 58 ***FOR GERMAN/USA 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 **JOKERZ Preset Game Adjustments Table for German Games**.

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:

Ad	Name	New Setting	Ad	Name	New Setting
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 NOT USED

GAME ADJUSTMENT PROCEDURE (Continued)

6 1 Install Novelty

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

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

6 2 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.

6 3 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.

6 4 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.

6 5 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.

6 6 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.

6 7 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.

GAME ADJUSTMENT PROCEDURE (Continued)

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 JOKERZ, 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, Piayer 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.

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 x 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.)

GAME PRICING (Continued)

JOKERZ Pricing Table

Country	Coin Chute Left	Coin Chute Center	Coin Chute Right	Games/Coin	Ad 24 Display	Pricing Functions 25	26	27	28	29	30
USA and Canada	25¢	-	25¢	1/25¢, 4/$1 [1,2]	U.S.A. 1	01	04	01	01	00	00
				1/50¢, 2/75¢, 3/$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
				1/25¢, 3/50¢, 6/$1	CUSTOM	01	04	01	01	02	00
				1/25¢, 5/$1	CUSTOM	01	00	01	01	04	00
				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.	01	00	06	03	00	01
United Kingdom	10 P	50 P	1£	1/8x10 P, 3/50 P, 7/1£ [2]	U.K.	03	15	30	05	30	00
	10 P	50 P	20 P	1/10 P, 5/50 P, 2/20 Pence	CUSTOM	01	05	02	01	00	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	20 F	20 F	20 F	3/20 Franc [2]	BELGIUM	03	03	03	01	00	00
	5 F	-	20 F	1/2x5 F, 2/20 Franc	CUSTOM	01	01	04	02	00	01
	5 F	20 F	20 F	1/2x5 F, 2/20 F, 2/20 F	CUSTOM	01	04	04	02	00	01
	5 F	5 F	20 F	1/2X5 F, 1/2X5 F, 2/20 F	CUSTOM	01	01	04	02	00	01
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
Sweden	1 Kr	5 Kr	5 Kr	1/3x1 Kr, 2/5 Krona [2]	SWEDEN	02	10	10	05	00	01
	1 Kr	-	1 Kr	1/2x1 Krona	CUSTOM	01	04	01	02	00	01
France	1 F	5 F	10 F	1/3x1 F, 2/5 F, 5/10 Franc [1,2]	FRANCE	02	10	20	05	20	00
Italy	500 L	500L	500 L	1/500 Lire [2]	ITALY	01	01	01	01	00	00
Spain	25 P	-	100 P	1/25 P, 5/100 Peseta [2]	SPAIN	01	00	05	01	00	00
Japan	-	100 ¥	-	2/100 ¥ [2]	JAPAN	01	04	01	02	00	01
	100 ¥	-	100 ¥	2/100 Yen	CUSTOM	02	00	02	01	00	00
Antilles, Netherl.	25¢	-	1G	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	01	06	14	02	00	01
Finland	1 Mka	-	5 Mka	1/2x1 Mka, 3/5 Markka [2]	FINLAND	01	00	06	02	00	01
New Zealand	20¢	-	20¢	1/2x20¢ [2]	N. Z.	01	04	01	02	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

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.

TEST/DIAGNOSTIC PROCEDURES

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

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

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

CAUTION

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.

DISPLAY TEST.

1. To initiate the Display Test, press ADVANCE. Observe that player 1 and 2 displays briefly show the message, DISPLAY TEST, and that the player 3 score display shows 01 (the Display Test identifier).

2. Use AUTO-UP. Observe that all displays begin a display cycle of all 0s through all 9s, one digit at a time. Verify that the proper comma segments light during display of the odd-numbered digits. Next, a special "all segments" character 'walks' from left to right across each player score display.

3. To halt the display cycle, use MANUAL-DOWN. Then, press ADVANCE to step through the sequential digit display, digit by digit, and the subsequent "all segments" characters display test. Use AUTO-UP to resume cycling, and to proceed to the next test.

SOUND TEST.

1. (From Display Test) To initiate the Sound Test, press ADVANCE. Observe that the player 1 and 2 displays show the message, SOUND TEST, and that the player 3 display shows 02 (the Sound Test identifier). The player 3 display shows a series of test steps from 00 through 07. Verify that a different sound is heard each time the number in the display changes.

2. To repeatedly pulse a single sound, use MANUAL-DOWN. Verify that one particular sound repeats. Press ADVANCE to step to the next sound, which repeats until ADVANCE is pressed again. Use AUTO-UP to resume cycling the sounds, and to proceed to the next test.

TEST/DIAGNOSTIC PROCEDURES (Continued)

LAMP TESTS.

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

2. **Single Lamps.**
   From the All Lamps test, using AUTO-UP, press ADVANCE to initiate the Single Lamps Test. The Player 1 and 2 displays initially show the message, SINGLE LAMPS, and the Player 3 display shows 04. Then, the Player 3 display shows 04 01, and the Player 1 and 2 displays change to show "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.

JOKERZ Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
Q80 1 RED-BRN 1J6-1	BONUS (left) 1K 1	BONUS 10K (TR) 9	**B** of BET 17	Drop Target (BL) 25	Spinners 3,000 33	Hearts 41	JACKPOT ** 49	0.5 Million Jackpot (BG) 57
Q81 2 RED-BLK 1J6-2	BONUS 1K 2	BONUS 50K 10	**E** of BET 18	Drop Target (BR) 26	Draw Poker 34	Spades 42	DEAL AGAIN 50	1.0 Million Jackpot (BG) 58
Q82 3 RED-ORN 1J6-3	BONUS 1K 3	2X 11	**T** of BET 19	Drop Target (TL) 27	Special 35	Clubs 43	UPF Illum (left) 51	1.5 Million Jackpot (BG) 59
Q83 4 RED-YEL 1J6-5	BONUS (right) 1K 4	3X 12	Left Outlane 20	**Ace** UPF 28	1 Bell 36	Diamonds 44	UPF Illum 52	2.0 Million Jackpot (BG) 60
Q84 5 RED-GRN 1J6-6	BONUS 5K 5	4X 13	L Return Lane 21	**King** UPF 29	2 Bells 37	Left Ramp 45	UPF Illum 53	2.5 Million Jackpot (BG) 61
Q85 6 RED-BLU 1J6-7	BONUS 10K (BL) 6	5X 14	R Return Lane 22	**Queen** UPF 30	3 Bells 38	Right Ramp 46	UPF Illum 54	3.0 Million Jackpot (BG) 62
Q86 7 RED-VIO 1J6-8	BONUS 10K (BR) 7	6X 15	Right Outlane 23	**Jack** UPF 31	4 Bells 39	Left Jet's 10K 47	UPF Illum 55	3.5 Million Jackpot (BG) 63
Q87 8 RED-GRY 1J6-9	BONUS 10K (TL) 8	7X 16	Double Scores (when Flashing) 24	**10** UPF 32	5 Bells Lites Special 40	Right Jet's 10K 48	UPF Illum (right) 56	4.0 Million Jackpot (BG) 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield BG = Backglass ** = 2 Lamps

SOLENOID TEST.

1. (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.

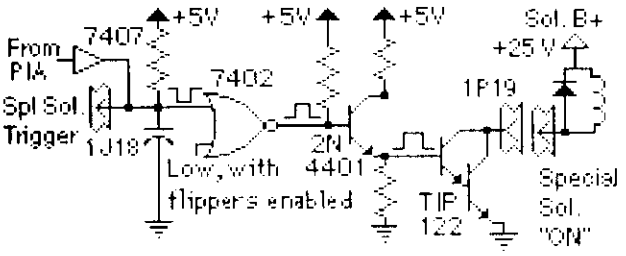
   To continuously pulse a single solenoid/circuit, use MANUAL-DOWN. Press ADVANCE to sequence through the switched, controlled, and special solenoids. Use AUTO-UP to resume test cycling, and to proceed to the next test.

JOKERZ Solenoid Table

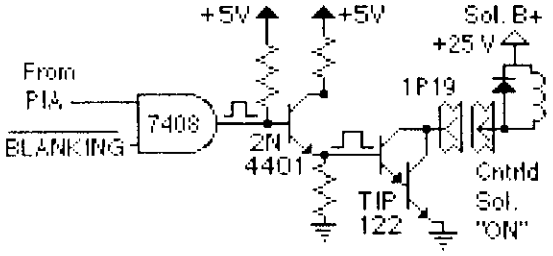
Sol. No.	Function	Solenoid Type	Wire Color [1]	Connections: CPU Bd	Connections: Playfield/ Cabinet	Driver Trnstr	Solenoid Part Number Flashlamp Type (i=Insert Bd; p=Playfield)
01A [3]	Outhole Kicker	Switched	Vio-Brn / Blk-Brn	1P11-1 (Gry-Brn)	5J1-9: 5J4-9 (A) 5J5-9 (C)	Q33	AE-23-800
01C [3]	Left UPF/"JO" (I) Flashers	Switched				Q33	#906/#89 flashlamps 1p,1i
02A [3]	Ball Release (Shtr Lane Feeder)	Switched	Vio-Red / Blk-Red	1P11-3 (Gry-Red)	5J1-7: 5J4-8 (A) 5J5-8 (C)	Q25	AE-23-800
02C [3]	UPF/"KE" (I) Flashers	Switched				Q25	#906/#89 flashlamps 1p,1i
03A [3]	Bottom Left 3-Bank Dr Tgt	Switched	Vio-Orn / Blk-Orn	1P11-4 (Gry-Orn)	5J1-6: 5J4-7 (A) 5J5-7(C)	Q32	AE-26-1200
03C [3]	UPF/"RZ" (I) Flashers	Switched				Q32	#906/#89 flashlamps 1p,1i
04A [3]	Bottom Right 3-Bank Dr Tgt	Switched	Vio- Yel / Blk-Yel	1P11-5 (Gry-Yel)	5J1-5: 5J4-6 (A) 5J5-5 (C)	Q24	AE-26-1200
04C [3]	Right UPF/"I" (I) Flashers	Switched				Q24	#906/#89 flashlamps 1p,1i
05A [3]	Top Left Kicker	Switched	Vio-Grn / Blk-Grn	1P11-6 (Gry-Grn)	5J1-4: 5J4-5 (A) 5J5-4 (C)	Q31	AE-23-800
05C [3]	DOUBLE SCORE (I) Flashers	Switched				Q31	#89 flashlamps 3i
06A [3]	Top Left 3-bank Dr Tgt	Switched	Vio-Blu / Blk-Blu	1P11-7 (Gry-Blu)	5J1-3: 5J4-4 (A) 5J5-3 (C)	Q23	AE-26-1200
06C [3]	TL Dr Tgt/Top Jokers (I) Flashers	Switched				Q23	#906/#89 flashlamps 1p,1i
07A [3]	Bottom Left Locking Kicker	Switched	Vio-Blk / Blk-Vio	1P11-8 (Gry-Vio)	5J1-2: 5J4-2 (A) 5J5-2 (C)	Q30	AE-26-1500
07C [3]	BL Dr Tgt/Mid Jokers (I) Flashers	Switched				Q30	#906/#89 flashlamps 1p,1i
08A [3]	Knocker	Switched	Vio-Gry / Blk-Gry	1P11-9 (Gry-Blk)	5J1-1: 5J4-1 (A) 5J5-1 (C)	Q22	AE-26-1200
08C [3]	BR Dr Tgt/Lwr Jokers (I) Flashers	Switched				Q22	#906/#89 flashlamps 1p, 1i
09	On Cntr Ramp/Jackpot (I) Flasher	Controlled	Brn-Blk	1P12-1	5J2-9; 5J6-9; 2J4-3	Q17	#906/#89 flashlamp 2p, 1i
10	Playfield/Insert Gnl Illum Relays	Controlled	Brn-Red	1P12-2	5J2-8: 5J6-8: 2J4-5	Q9	5580-12145-01 [4]
11	Wheel (I) Flashers	Controlled	Brn-Orn	1P12-4	5J2-6: 5J6-7: 2J4-6	Q16	#89 flashlamps 4i
12	A/C Select Relay	Controlled	Brn-Yel	1P12-5	5J2-5	Q8	5580-09555-01 [5]
13	Wheel Coil B (I)	Controlled	Brn-Grn	1P12-6	5J2-4: 5J6-5	Q15	14-7948
14	Wheel Coil A (I)	Controlled	Brn-Blu	1P12-7	5J2-4: 5J6-3	Q7	14-7948
15	Cntr Ramp Motor	Controlled	Brn-Vio	1P12-8	5J2-2: 5J6-2	Q14	14-7944
16	TR Eject	Controlled	Brn-Gry	1P12-9	5J2-1: 5J6-1	Q6	AE-23-800
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	In Cntr Ramp Flasher	Special #6	Blu-Blk	1P19-9	5J3-1: 5J7-1	Q79	#906 flashlamp 2p
-	Right Flipper	-	Orn-Vio [Blu-Vio] [2]	1P19-1	2J3-1: 2J18-10: 7P1-15 [7P1-16: 2J18-6: 2J17-4]	-	FL11630/50VDC
	Lower Right Flipper						
-	Left Flipper	-	Orn-Gry [Blu-Gry] [2]	1P19-2	2J3-2: 2J18-9: 7P1-18 [7P1-19,2J18-5:2J17-3]	-	FL11630/50VDC
	Lower Left Flipper						

Notes: 1. Wire colors, except flipper Orn-Vio and Orn-Gry, are ground connections (to coil terminal with unbanded end of diode). Flipper Orn-Vio and Orn-Gry wires connect from CPU Board to flipper switch. 2. Flipper connections shown in braces are from flipper switch to flipper coil. 3. "A" 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, p/n C-11908-1. 5. Relay is mounted on Aux Power Driver Bd, D-12247 in the backbox.

"On" State Logic - Special Solenoid



"On" State Logic - Controlled Solenoid



"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. Meanthe 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 Pin•Bot Flashers 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.

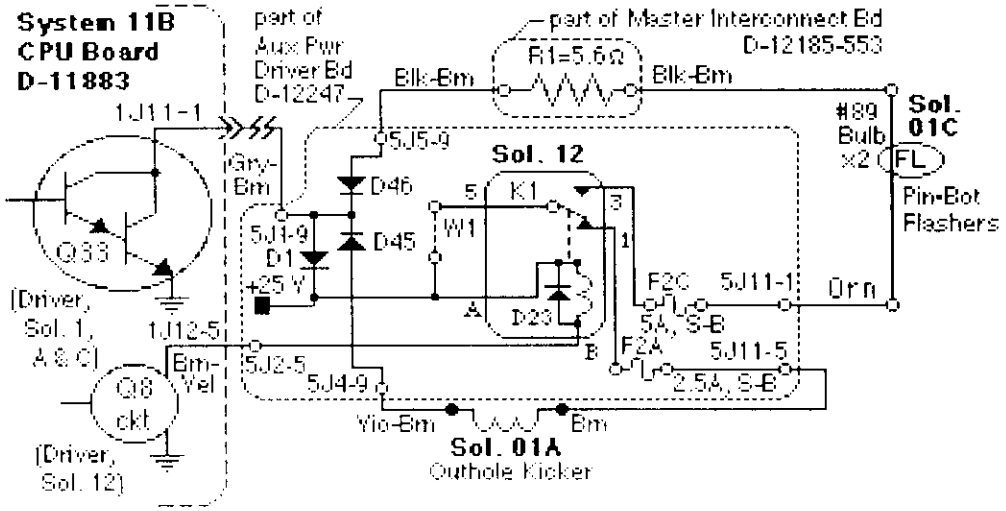


Figure 4. Typical Solenoid A/C Select Relay Circuit, showing the function of Solenoid 12, the Solenoid A/C Select Relay.

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 **JOKERZ** 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 **JOKERZ**, 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.

JOKERZ Switch-Matrix Table

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Playfield Tilt 9	B of BET 17	BL 3-Bank DT (top) 25	33	TL 3-Bank DT (top) 41	Left Ramp Score 49	Lane Change Right 57
2 WHT-RED 1J10-8	CSide Power A/C Relay 2	Outhole 10	E of BET 18	BL 3-Bank DT (mid) 26	34	TL 3-Bank DT (mid) 42	Right Ramp Score 50	Lane Change Left 58
3 WHT-ORN 1J10-7	Credit Button 3	Ball Trough #1 11	T of BET 19	BL 3-Bank DT (bottom) 27	35	TL 3-Bank DT (bottom) 43	51	Draw Poker Home Backglass 59
4 WHT-YEL 1J10-6	Left Coin Chute 4	Ball Trough #2 12	Left Outlane 20	Ace UPF 28	BR 3-Bank DT (top) 36	TL Kicker 44	Ramp RAISE 52	Left Jet Bumper 60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Ball Trough #3 13	Left Return Lane 21	King UPF 29	BR 3-Bank DT (mid) 37	Left Lock 1 Ball 45	10 pt (TR) 53	Right Jet Bumper 61
6 WHT-BLU 1J10-3	Right Coin Chute 6	Ball Shooter 14	Right Return Lane 22	Queen UPF 30	BR 3-Bank DT (bottom) 38	Left Lock 2 Balls 46	54	Lower Jet Bumper 62
7 WHT-VIO 1J10-2	Slam Tilt 7	Ramp UP 15	Right Outlane 23	Jack UPF 31	39	TR Eject 47	55	BL Kicker ("sling") 63
8 WHT-GRY 1J10-1	High Score Reset 8	Ramp DOWN 16	Double Score Target 24	10 UPF 32	40	Spinner 48	10 pt (BR) 56	BR Kicker ("sling") 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield

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

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

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

Use AUTO-UP to proceed to the next test.

SWITCH TESTS (Continued).

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

This test permits the operator to test whether actuating a switch provides the proper signal to the System-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 **JOKERZ** 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**) should produce an indication of switch 09 being actuated.

DRAW POKER WHEEL TEST

From the Switch Edges Test, press ADVANCE. Observe that the Player 1 and 2 displays show the message, WHEEL TEST, and that the Player 3 displays shows 08 (Draw Poker Wheel Test identifier).

The Player 2 display now shows the last known position of the Draw Poker Wheel, while the Player 4 display is divided to show the 'state' of the Home Switch. On the left of the Player 4 display, an "H" means that the Home Switch is open or the opto is interrupted; on the right, a number shows the count of the stepper wheel (1-200; however, if the Home Switch is not working, the number can go as high as 256).

Using AUTO-UP, the test is automatic: The wheel spins, waits for 2 seconds, then spins again. The wheel stops on the next counterclockwise position of the wheel, if the Home Switch works.

Using MANUAL-DOWN, press ADVANCE to spin the wheel. The wheel stops on the next counterclockwise position of the wheel, if the Home Switch works. If the wheel is not spinning, you can manually step the motor by pressing Credit button.

During the test, the Player 3 display shows 08Err, if errors occur (the game program did not detect the Home Switch).

C-SIDE TEST

From the Wheel 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.

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 show the **JOKERZ** game's Identification Information. Use 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, and the Solenoid Test.

3. To halt the Auto Burn-in Mode, switch the game Off and then On. **JOKERZ** 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.)

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, LED2 ('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 start the self-testing routine by pressing the CPU Diagnostic Switch (SW 2) on the edge of the CPU Board.

TEST/DIAGNOSTIC PROCEDURES (Continued)

CPU LED Indicator Codes Table

Diagnostic LED		
Blinks/ Flashes	**Display Message**	**Explanation**
1	U25 RAM FAILURE	U25 RAM could not be used properly (NO other tests are performed; the game is locked here, until the game is turned off).
2	MEM. PROT. FAILURE	This message means that (A) the Coin Door may be shut; (B) the Memory Protect Switch may be stuck in the ON position; (C) the memory protect logic is protecting the memory; or (D) a U25 RAM failure is occurring. (See Note 1)
3	U51 PIA FAILURE	U51 has a malfunction. (See Note 2)
4	U38 PIA FAILURE	U38 has a malfunction. (See Note 2)
5	U41 PIA FAILURE	U41 has a malfunction. (See Note 2)
6	U42 PIA FAILURE	U42 has a malfunction. (See Note 2)
7	U54 PIA FAILURE	U54 has a malfunction. (See Note 2)
8	U10 PIA FAILURE	U10 has a malfunction. (See Note 2)
9	IRQ FAILURE	IRQ has a malfunction. It may be missing or too fast or too slow.
10	U27 ROM FAILURE	U27's internal checksums do not match. It may be a ROM failure, or its associated connections and connectingdevices 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 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 **JOKERZ**, 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).

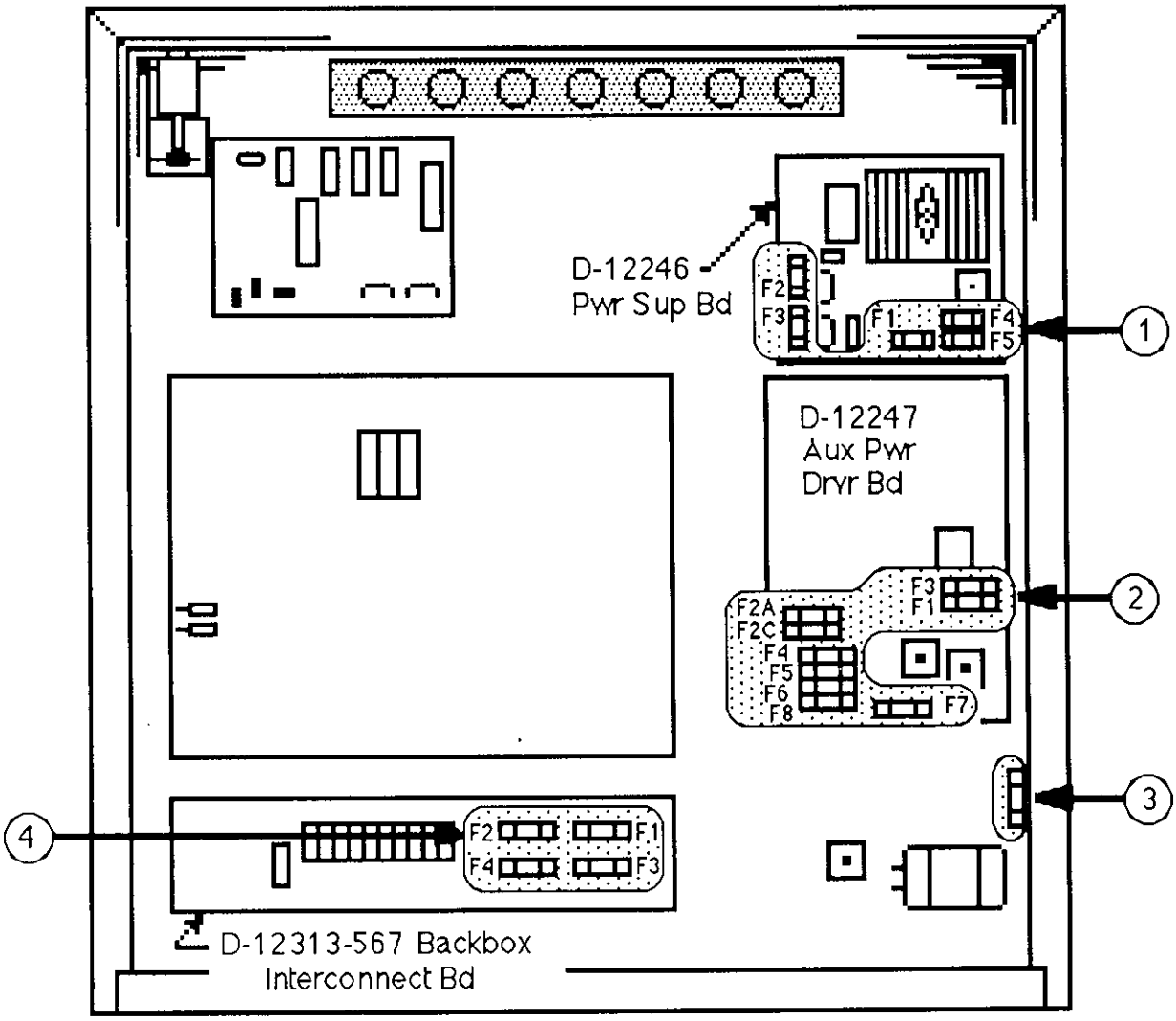
If the previous checks did not isolate the problem, turn the Volume Control for maximum output. Momentarily touch a powered-up AC soldering pencil on the center tap of the Volume Control.

CAUTION

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

Hearing a low hum 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 .

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; 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	F4 - 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 Backbox fuseholder (1)
4	5731-09651-00	Fuse, 5A., S-B, 250v	F1 - F4: Gen. Illumination/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.

MAINTENANCE INFORMATION

Figure 3 shows the two main lubrication points of the Shooter Lane Feeder. The shaded arrows show the directions in which the Shooter Lane Feeder and other parts of its related assemblies can be adjusted for proper operation. Note that the mechanisms of the Top Right Eject Hole Arm Assembly and the Right Lock (Eject Hole) are quite similar to the Shooter Lane Feeder; they have the same lubrication requirements and adjustment capabilities as the Shooter Lane Feeder.

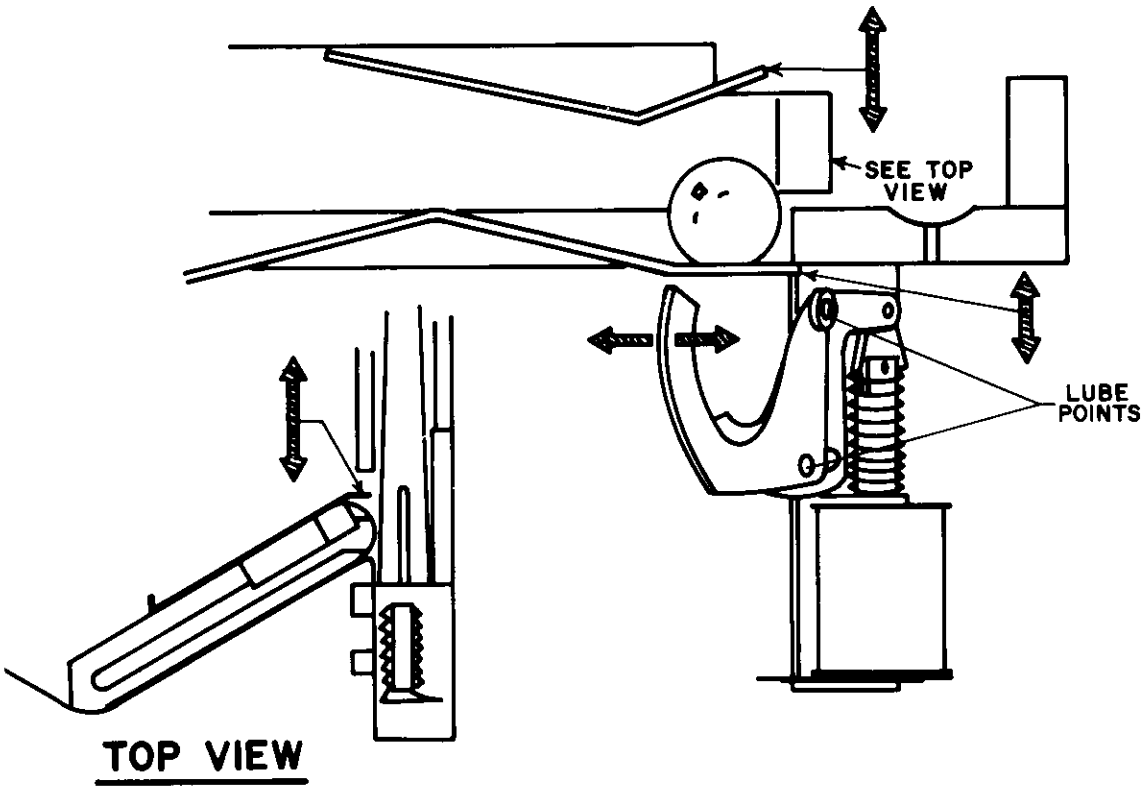


Figure 3. Adjustments and Lubrication Points, Shooter Lane Feeder.

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

Lubrication to ensure proper operation also applies to the target blades of the two 3-Bank Drop Targets. Regular maintenance is essential to a game's continuing contribution to the operator's earnings.

Section 2

Game Parts Information

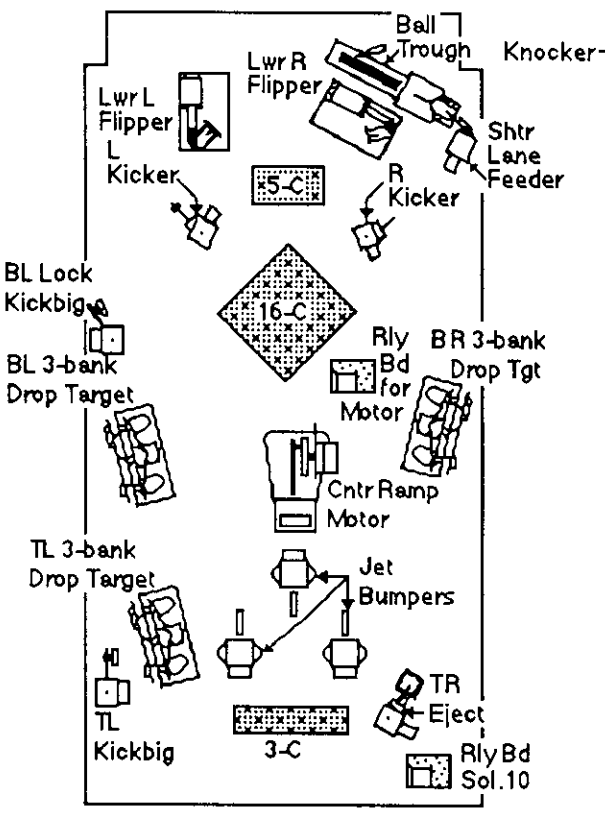
- ***Parts Lists & Diagrams***

  Locations:
  Game Circuit Boards and Major Mechanisms

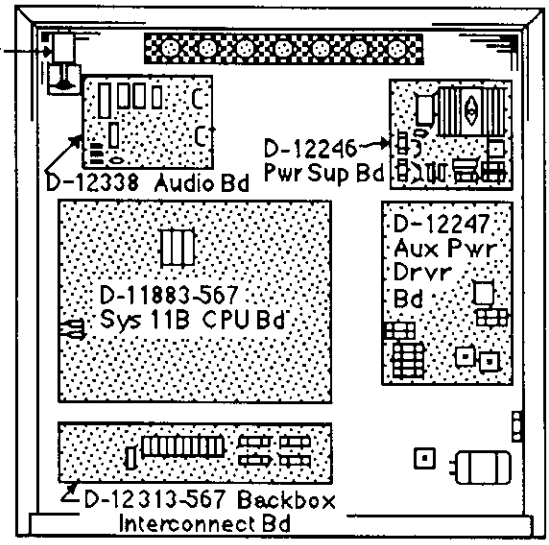
  Power Supply Board (D-12246)
  Aux Power Driver Board (D-12247-559)
  Backbox Interconnect Board (D-12313-567)
  Audio Board (D-12338-567)
  System 11-B CPU Board (D-11883-567)
  Master Display Board (D-12232-1)
  Lamp Boards

  All Major Mechanism Assemblies of *JOKERZ*

  Solenoids/Flashers & Rubber Parts
  Switches
  Lamps
  Playfield Parts

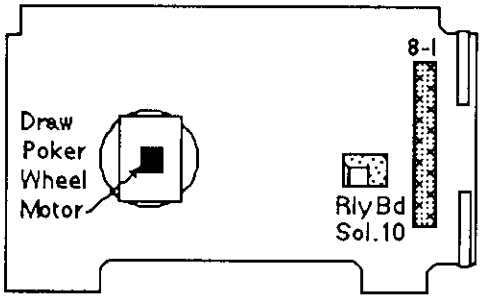


Underside of Playfield
Viewed in Raised Position

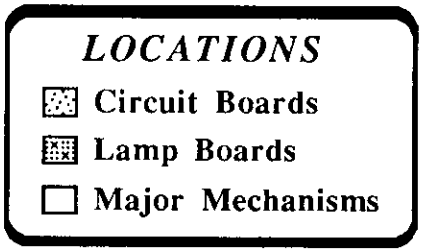


Backbox

Display/Speaker Panel

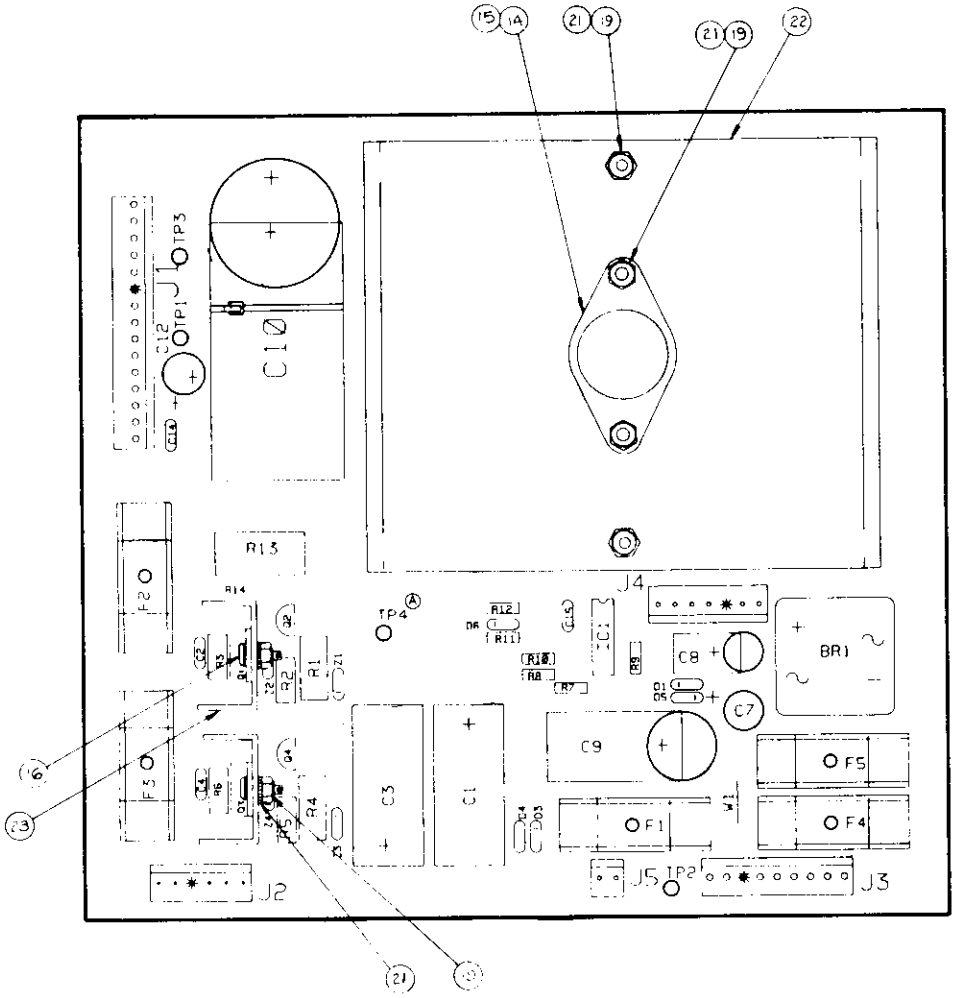


Inside of Insert Board
Viewed in Open Position



Locations Diagram - Game Circuit Boards and Major Mechanisms

C-11626-L-3	Lower Left Flipper	B-10686-2	Knocker Assembly
C-11626-R-3	Lower Right Flipper	D-12338-567	Audio Board
C-9638-3	Ball Shooter Lane Feeder	D-12246	Power Supply Board
B-9362-R-1	Coil & Bracket Assembly	D-11883-567	System 11B CPU Board
C-12315	Lamp Board ("5-C")	D-12247-559	Aux Power Driver Board
B-12283	Left & Right Kicker Arm Assembly	D-12313-567	Backbox Interconnect Board
B-11203-R-1	Coil & Bracket Assembly		
D-12221	Lamp Board ("16-C")	D-12232-1	Master Display Board
B-11395-1	BL Lock Kickbig		
B-11203-R-1	Coil & Bracket Assembly	C-12098	Lamp Board ("8-I")
C-11223-1	BL, BR, & TL 3-Bank Drop Targets	C-11998-1	Relay Board (Sol. 10 Gen. Illum)
C-11318-1	3-Bank Opto Board	C-12036-1	Draw Poker Wheel Assembly
C-11902-1	Relay Board (Cntr Ramp Motor)	B-12088	Motor & Control Bd Assembly
C-12281	Ramp Lifting Motor Assembly	D-12045	Motor Control Board
B-9414-2	Jet Bumper (Lwr, R, L)	03-8161	Wheel
B-9415-1	Bumper Coil & Bracket Assy	31-1473-1	Wheel Decal
B-11395-1	TL Kickbig Assy	14-7048	Stepper Motor
B-9362-R-1	Coil & Bracket Assembly		
B-9361-R-6	TR Eject Hole Arm Assembly		
B-9362-R-1	Coil & Bracket Assembly		
C-12000	Lamp Board ("3-C")	C-11998-1	Relay Board (Sol. 10 Gen. Illum)

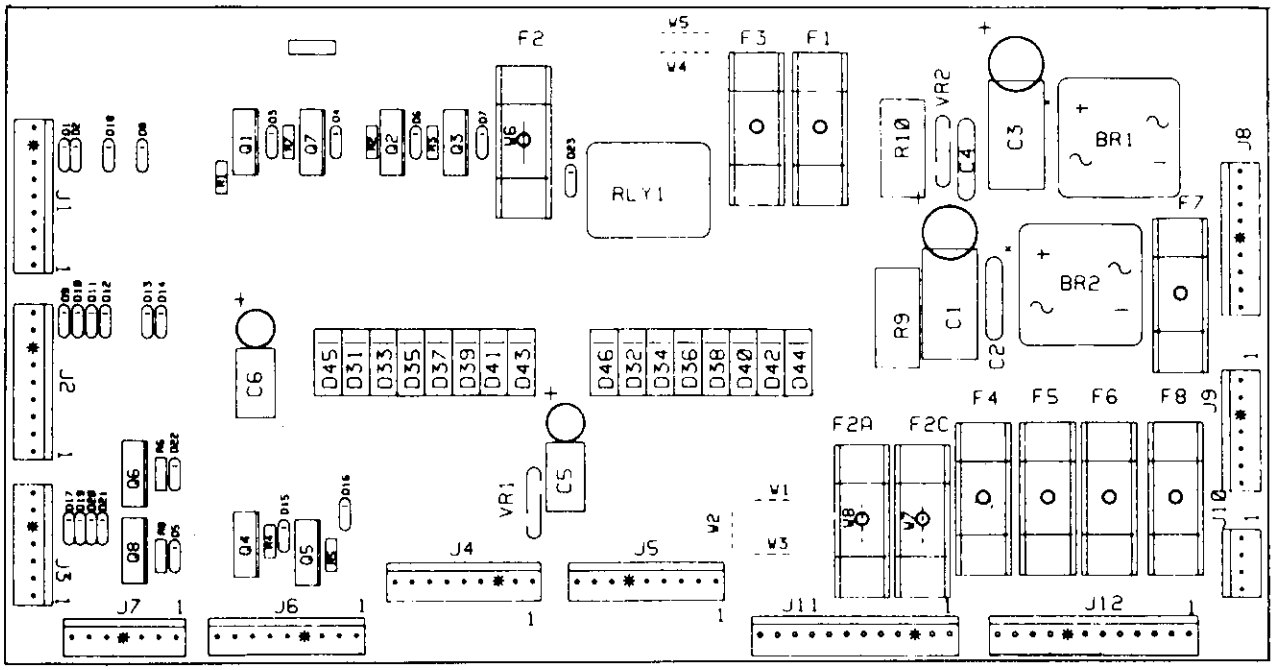


Power Supply

p/n D-12246

Item	Part No.	Ckt Designator	Description
1	5765-12317-00		Power Supply PCB
2	5733-12060-01	F1-F5	Fuse Holder
3	5731-09432-00	F4, F5	Fuse, 7A., S-B, 250v
4	5731-12328-00	F1	Fuse, 3/8A., S-B, 250v
5	5730-12327-00	F2, F3	Fuse 1/8 A., 250v
6	5791-10862-15	J1	Connector, 15-pin Hdr, Sq Pin .156
7	5791-10862-06	J2	Connector, 6-pin Hdr, Sq Pin .156
8	5791-10862-09	J3	Connector, 9-pin Hdr, Sq Pin .156
9	5100-09690-00	BR1	Bridge Rectifier, 35A., 200V
10	5164-12154-00	Q1	Transistor, MJE15030, NPN
11	5194-12155-00	Q3	Transistor, MJE15031, PNP
12	5194-09055-00	Q2	Transistor, MPSD52, PNP
13	5164-09056-00	Q4	Transistor, MPSD02, NPN
14	5162-09425-00	Q5	Transistor, 2N6057, NPN
15	5701-09652-00		Thermal Pad T0-3
16	4006-01003-06		Mach. Screw, 6-32 x 3/8
17	4006-01003-08		Mach. Screw, 6-32 x 1/2
18	20-9229		Thermal Compound
19	4406-01117-00		Nut, 6-32 Hex.
20	5010-09534-00	W1	Resistor,0Ω
21	4703-00007-00		Lockwasher, #6 Ext.
22	5705-12330-00		Heatsink 4"
23	5705-09199-00		Heatsink 6030B
24	5070-09054-00	D1, D3 - D6	Diode, 1N4004
25	5075-09059-00	ZR1, ZR3	Zener, 1N5990, 3.9v, 1/2w
26	5075-09060-00	ZR2, ZR4	Zener, 1N4764, 100v, 1w
27	5460-09424-00	IC1	IC, Volt. Reg., MC1723C5
28	5010-09069-00	R3, R6	Resistor, 330K, 5%, 1/2w, C.F.
29	5010-10631-00	R2, R5	Resistor, 1.2K, 5%, 1/2w
30	5010-09536-00	R1, R4	Resistor, 39K, 5%,1w
31	5013-09426-00	R7	Resistor, 2.15K, 1%, 1/4w, C. F.
32	5013-09427-00	R8	Resistor, 4.99K, 1%, 1/4w, C. F.
33	5010-09541-00	R9	Resistor, 2.7K, 2%,1/4w, C. F.
34	5010-09085-00	R10	Resistor, 1.5K, 5%,1/4w, C. F.
35	5010-09428-00	R11	Resistor, 1.5K, 2%, 1/4w, C. F.
36	5010-09508-00	R12	Resistor, 270Ω, 2%, 1/4w, C. F37
37	5012-09429-00	R13	Resistor, 0.12Ω, 5%,5w
38	5040-12324-00	C1, C3	Capacitor, 150 mfd, 160v, radial
39	5043-09072-00	C2, C4	Capacitor, 0.1 mfd, 500v, disc
40	5040-09421-00	C7	Capacitor, 100 mfd, 25v, radial
41	5040-09422-00	C8	Capacitor, 47 mfd, 50v, radial
42	5040-09420-00 5040-08893-00	C9	Capacitor, 1000 mfd, electr, 25v, axial or radial
43	5040-09419-00	C10	Capacitor, 18,000 mfd, electr, 20v, axial
44	5040-09423-00	C12	Capacitor, 330 mfd, electr, 10v,radial
45	5043-09446-00	C14	Capacitor, 0.1 mfd, 50v, disc
46	5043-09065-00	C15	Capacitor, 470 pfd
47	5824-09248-00	TP1-TP4	Terminal, #1502-1 (Test Post)
48	03-7947		Tie Wrap, 8" Long

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

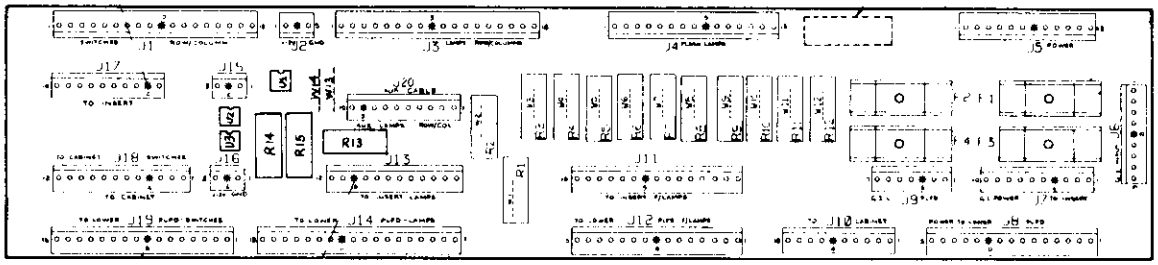


Aux Power Driver Unit Board

p/n D-12247-559

Part No.	Ckt Designator	Description
5763-12184-00		Bare P. C. Board
5040-09537-00	C1, C3	Capacitor, 100 µfd., 100v, Radial
5040-12181-00	C5, C6	Capacitor, 10 µfd., 100v, Radial
5043-09072-00	C2, C4	Capacitor, 0.1 µfd., 500v
5010-09160-00	R1 - R8	Resistor, 220Ω, 1/4w C.F., 5%
5012-12238-00	R9	Resistor, 3.3KΩ, 5w, 10%
5010-09534-00	W1, W3, W4, W6	Resistor, 0Ω, 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

Part No.	Ckt Designator	Description
5580-09555-01	K1	Relay, DPDT, 13A
5733-12060-01		Fuse Holder
5731-08665-00	F4, F5, F6	Fuse, 2A, S-B, 250v
5731-09128-00	F1, F2A, F3	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

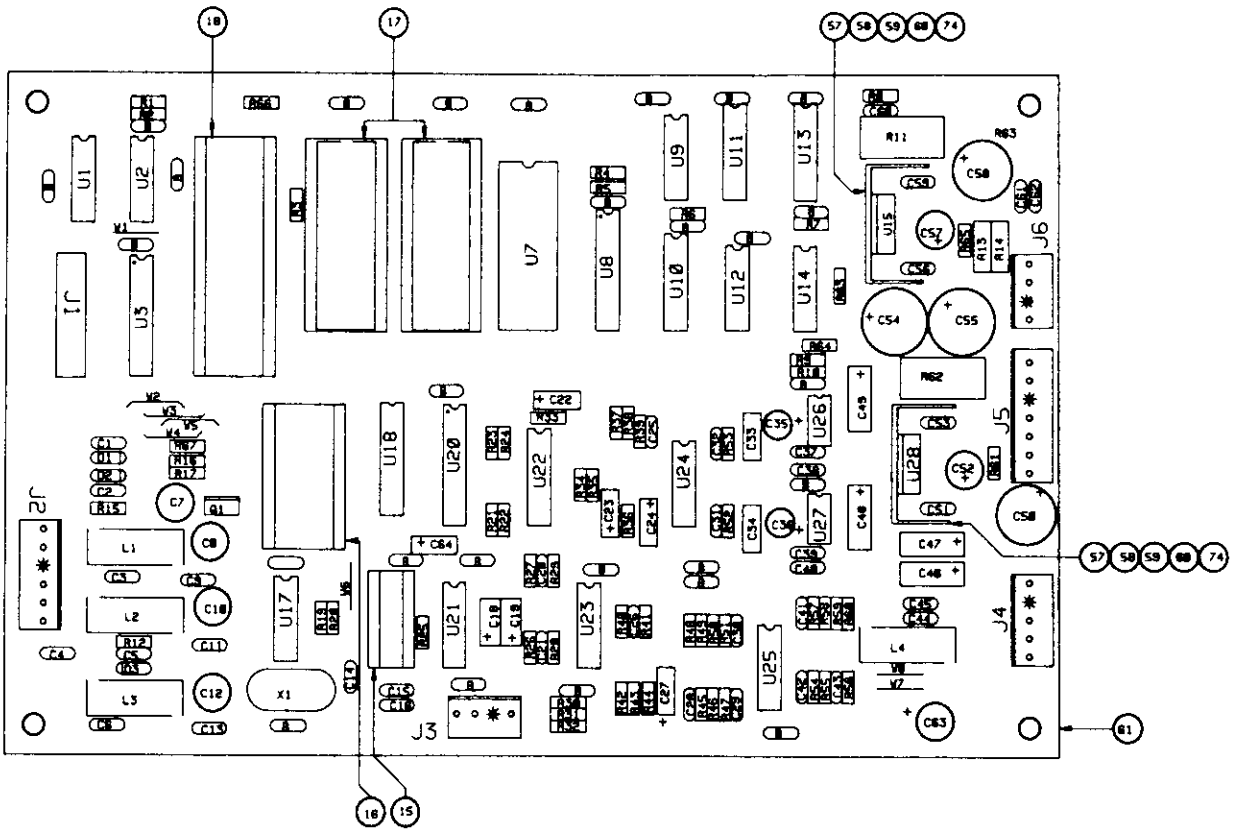


Backbox Interconnect Board

p/n D-12313-567

Part No.	Ckt Designator	Description
5768-12332-00		Master Interconnect Board
16-8850-222		PCB. I.D. Label
5010-09534-00	W1-W12	Resistor, 0Ω
5012-12238-00	R14, R15	Resistor, 3.3KΩ, 5w, 10%
5012-12337-00	R13	Resistor, 1.5KΩ, 5w, 10%
5490-10892-00	U1 - U3	Opto Isolator 4N25
5731-09651-00	F1, F2, F3, F4	Fuse, 5A.S.B., 250v
5733-12060-01	F1, F2, F3, F4	Fuse Holder
5791-10862-03	J2, J15, J16	Connector, 3-pin Hdr Sq Pin .156

Part No.	Ckt Designator	Description
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, J17	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



Audio Board

p/n D-12338-567

Item	Part No.	Ckt Designator	Description
1	5370-12279-00	U22	IC, Analog Sw, ADG201
2	5370-09156-00	U15, U28	IC, Aud Amp, TDA2002
3	5340-12278-00	U7	RAM 2064
4	5370-10968-00	U21, U23-U25	IC, Op Amp, MC3303
5	5370-12260-00	U26, U27	IC, Elec Attenuator, 3340
6	5371-12262-00	U18	IC, D/A Convtr, PM7224
7	5281-09247-00	U9	IC, Quad. Nor, 74LS02
8	5281-09215-00	U17	IC, Hex Inv, 74LS04
9	5281-09850-00	U12	IC, Triple NAND, 74LS11
10	5281-09487-00	U2, U14	IC, Dual D Flipflop, 74LS74
11	5281-10007-00	U13	IC, Mlt Vib, 74LS123
12	5281-09745-00	U11	IC, Dual Mux, 74LS138
13	5281-09246-00	U10	IC, 2-4 Dec, 74LS139
14	5281-09486-00	U3, U8, U20	IC, Dual D Flipflop, 74LS374
15	5700-09006-00	U19	Socket, IC, 16-Pin
16	5700-09004-00	U16	Socket, IC, 24-Pin
17	5700-12088-00	U5, U6	Socket, IC, 32-Pin
18	5700-08985-00	U4	Socket, IC, 40-Pin
19	5010-09534-00	W1, W2, W4, W6	Resistor, 0Ω
20	5010-09181-00	R13, R14	Resistor, 1Ω, 1/2w, 5%
21	5010-09161-00	R63, R64	Resistor, 2.2Ω, 1/4w, 5%
22	5010-10170-00	R61, R65	Resistor, 47Ω, 1/4w, 5%
23	5010-10919-00	R11, R62	Resistor, 100Ω, 1w, 5%
24	5010-09036-00	R17, R25	Resistor, 100Ω, 1/4w, 5%
25	5010-09224-00	R16	Resistor, 270Ω, 1/4w, 5%
26	5010-09416-00	R3, R12	Resistor, 470Ω, 1/4w, 5%
27	5010-09033-00	R15	Resistor, 680Ω, 1/4w, 5%
28	5010-10983-00	R10	Resistor, 1.8KΩ, 1/4w, 5%
29	5010-08998-00	R19, R20	Resistor, 2.2KΩ, 1/4w, 5%
30	5010-08997-00	R42	Resistor, 2.7KΩ, 1/4w, 5%
31	5010-08991-00	R1, R2, R4-R8, R66, R67	Resistor, 4.7KΩ, 1/4w, 5%
32	5010-09034-00	R21-R24, R26-R32, R39-R41, R47, R48, R51-R54, R58, R60	Resistor, 10KΩ, 1/4w, 5%
33	5010-08774-00	R43, R45	Resistor, 22KΩ, 1/4w, 5%
34	5010-09324-00	R33	Resistor, 27KΩ, 1/4w, 5%
35	5010-09325-00	R56	Resistor, 39KΩ, 1/4w, 5%
36	5010-09035-00	R59	Resistor, 47KΩ, 1/4w, 5%
37	5010-10650-00	R46, R55	Resistor, 62KΩ, 1/4w, 5%
38	5010-09333-00	R49	Resistor, 180 KΩ, 1/4w, 5%
39	5010-09442-00	R36, R38, R44	Resistor, 330KΩ, 1/4w, 5%
40	5010-10989-00	R34, R35, R37, R50, R57	Resistor, 470KΩ, 1/4w, 5%
41	5043-09492-00	C14	Capacitor, 100pfd, 50v, +10%
42	5043-09065-00	C20, C21, C25, C26, C30, C31, C32, C41	Capacitor, 470 pfd, 50v, + 20%
43	5043-10039-00	C37, C39	Capacitor, 560pfd, 50v, +5%
44	5048-11031-00	C29, C38, C40, C42,C60	Capacitor, .001µfd, 50v, 10% Axial
45	5048-12282-00	C15, C16	Capacitor, 3300 pfd, 100v, Axial
46	5043-08980-00	BYPASS	Capacitor, .01µfd, 50v, +80, -20%
47	5043-09030-00	C28, C43	Capacitor, .047 µfd, 50v, + 20%
48	5043-08996-00	C1-C6, C9, C11, C13, C44, C45, C51, C53, C56, C59, C61, C62	Capacitor, .1µfd, 50v, + 20%
49	5040-09365-00	C22-C24, C27	Capacitor, 1µfd, 63v, +50, -10%
50	5040-12293-00	C33, C34	Capacitor, 1µfd, 50v, + 20% Axial
51	5040-12294-00	C46-C49	Capacitor, 2.2 µfd
52	5040-09343-00	C18, C19, C64	Capacitor, 10µfd, 20v, + 20%
53	5040-12283-00	C35, C36	Capacitor, 47µfd, 25v
54	5040-10974-00	C8, C10, C12, C52, C,57, C63	Capacitor, 100µfd, 35v
55	5040-09776-00	C7, C50, C58	Capacitor, 470µfd 16v, +50, -10%
56	5040-12006-00	C54, C55	Capacitor, 1000µfd, 16v, 20% Radial
57	4703-00007-00		Lockwash, #6 Ext.
58	4406-01117-00		Hexnut, 6-32
59	4006-01003-06		Mach. Screw, 6-32 x 3/8
60	5705-09199-00		Heatsink, #6030B
61	5766-12342-00		Bare PC Board
62	5791-09437-00	J1	Connector, 20 Pin Rib. Cbl
63	5791-10862-07	J5	Connector, 7-pin Sq Pin .156
64	5791-10862-06	J2	Connector, 6-pin Sq Pin .156
65	5791-10862-05	J4	Connector, 5-pin Sq Pin .156
66	5791-10862-04	J3, J6	Connector, 4-pin Sq Pin .156
67	5551-09822-00	L1-L4	Inductor, 4.7µH, 3A
68	5521-10931-00	U1	Oscillator, 8 MHz
69	5520-09020-00	X1	Crystal, 3.58 MHz
70	5162-09410-00	Q1	TIP 122
71	5075-12364-00	D2	Zener, 1N5240 10v, 1/2w
72	5075-09313-00	D3	Zener, 1N5231 5.1v, 1/2w
73	5075-12276-00	D1	Zener, 1N5227 3.6v
74	20-9229		Thermal Compound
75	5370-11086-00	U16	IC, YM2151, Sound
76	5371-11087-00	U19	IC, D/A Conv., YM3012
77	5400-10320-00	U4	IC, MPU 68B09E
78	A-5343-567-5	U5	ROM Assembly

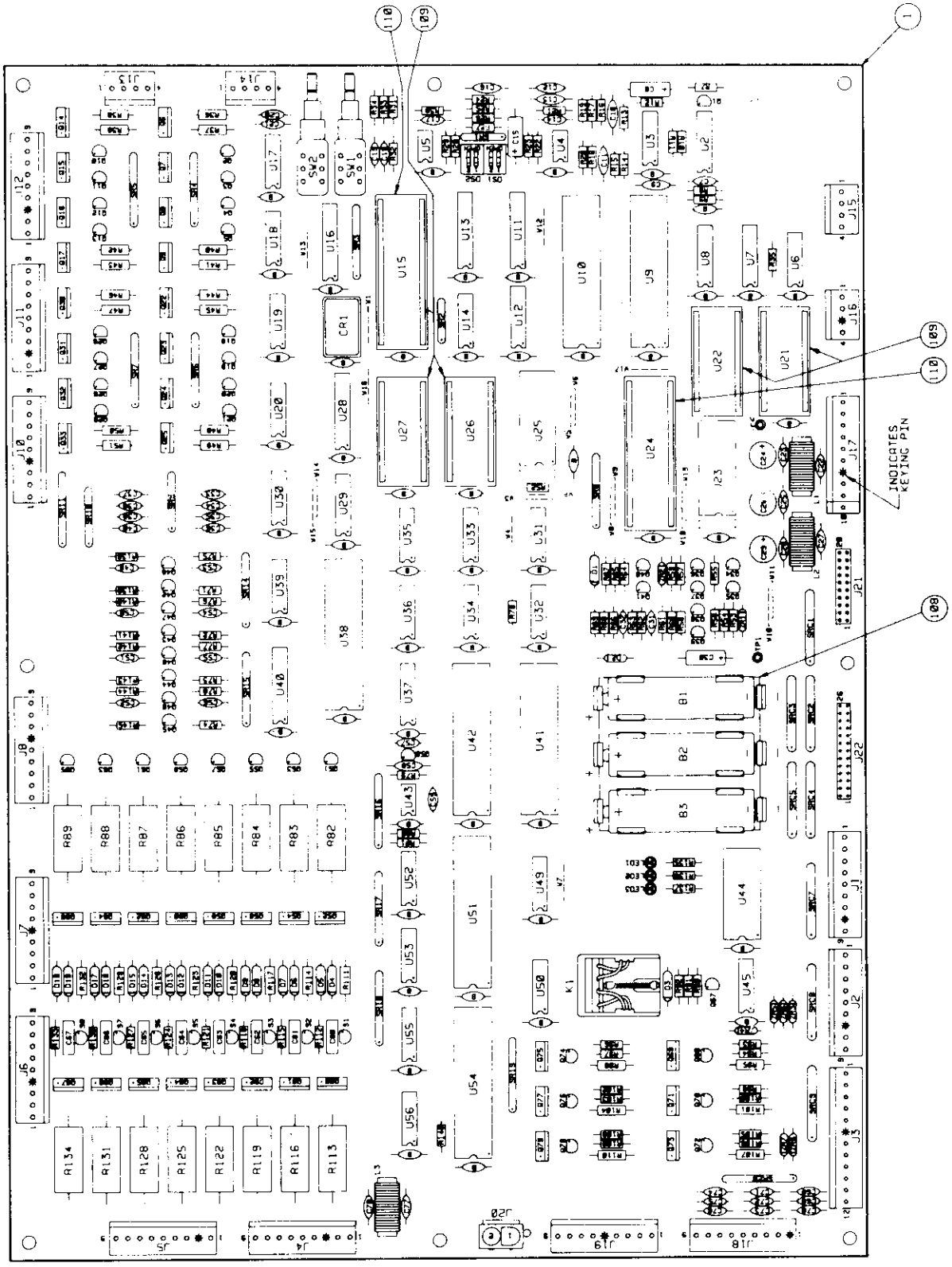
System 11B CPU Board

p/n D-11883-567

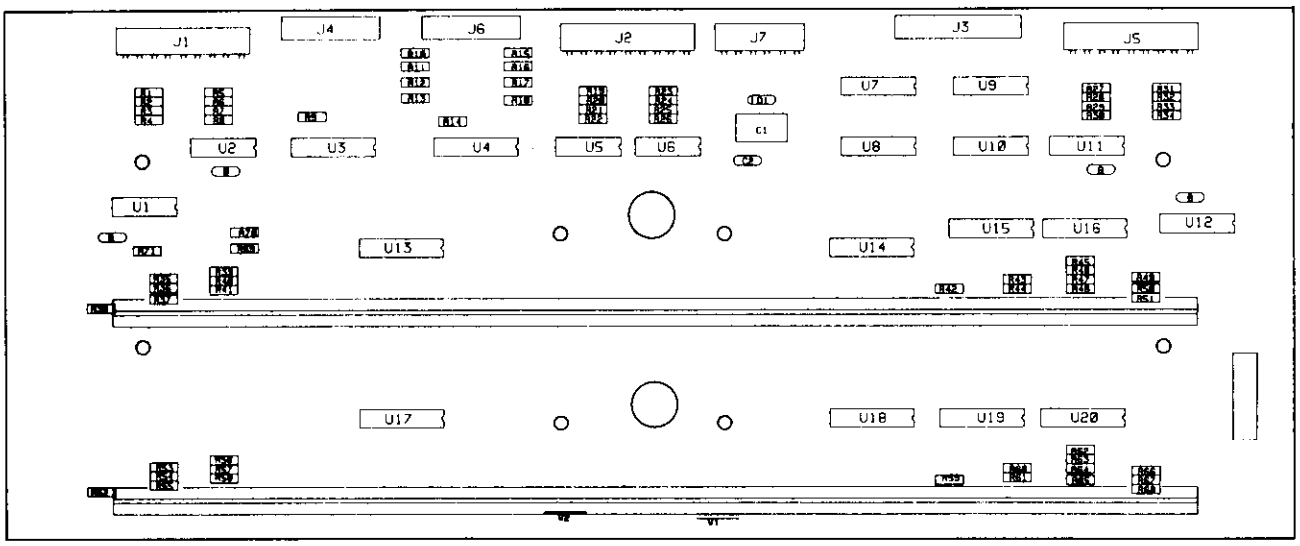
Item	Part No.	Ckt Designator	Description
1	5764-12206-00		Bare P. C. Board
2	5370-09691-00	U3	IC, CVSD Mod., 55536
3	5370-09321-00	U4, U5	IC, Dual Op Amp, 1458
4	5281-09308-00	U16	IC, Octal Bus Xcvr, 74LS245
5	5430-08972-00	U9, U10, U38, U41, U42, U51, U54	IC, PIA, MC6820/6821
6	5340-10139-00	U25	IC, 2K x 8 CMOS Static RAM
7	5280-09010-00	U44	IC, 4-16 Decoder, 74154
8	5281-09246-00	U7, U8, U12	IC, 2-4 Decoder, 74LS139
9	5075-09406-00	ZR3 - ZR8	Diode, Zener, 6.2v, 0.5w
10	5164-10998-00	Q42 - Q49	Transistor, NPN, 2N5550, TO-92
11	5281-09487-00	U6	IC, Dual D Flip-flop,74LS74
12	5431-09449-00	U43	IC, Timer, MC1455
13	5310-09236-00	U29	IC, 14-b Counter, 4020
14	5281-09743-00	U32	IC, Quad 2-Input AND, 74LS08
15	5281-09247-00	U14	IC, Quad 2-Input NOR, 74LS02
16	5281-09235-00	U35	IC, Triple 3-Input NAND, 74LS10
17	5280-09013-00	U36	IC, Hex Inverter, 7404
18	5281-09499-00	U31, U34	IC, Quad 2-Input NAND, 74LS00
19	5281-10014-00	U33	IC, Dual 4-Input NAND, 74LS20
20	5281-09486-00	U28	IC, Octal D Flip-flop, 74LS374
21	5371-09152-00	U2	IC, D/A Converter, MC1408
22	5281-09745-00	U37	IC, 3-8 Decoder, 74LS138
23	5340-09878-00	U23	IC, 2K x 8 Static RAM, 2016
24	Not Used		
25	5281-09867-00	U11, U13, U40	IC, Octal Buffer, 74LS244
26	5280-08973-00	U17-U20, U52, U53	IC, Quad 2-Input AND, 7408
27	5280-08974-00	U55, U56	IC, Hex Inverter, 7406
28	5310-09155-00	U30, U39	IC, Quad 2-Input NAND, MC14011
29	5280-08948-00	U45, U50	IC, Quad 2-Input NOR, 7402
30	5280-09309-00	U49	IC, Hex Buffer, 7407
31	5671-09019-00	LED1-LED3	LED, Red, Display
32	5521-10506-00	CR1	Oscillator, 4 MHz
33	5162-08976-00	Q51, Q53, Q55, Q57, Q59, Q61, Q63, Q65	Transistor, NPN Darl. 2N6427, TO-92
34	5191-08978-00	Q52, Q54, Q56, Q58, Q60, Q62, Q64, Q66	Transistor, PNP, TIP42, TO-220
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
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
37	5160-10269-00	Q1, Q40	Transistor, NPN, 2N3904, TO-92
38	5190-09016-00	Q39, Q50	Transistor, PNP, 2N4403, TO-92
39	5130-09014-00	S1-S8	SCR, 30v, 0.8A, 2N5060
40	5070-06258-00	D3-D19	Diode, 1N4001
41	5070-08919-00	D2	Diode, 1N4148, 150mA
42	5070-09266-00	D1	Diode, 1N5817, 1.0A
43	5075-09018-00	ZR1	Diode, Zener, 1N5996A, 6.8v, 0.5w
44	5075-09059-00	ZR2	Diode, Zener, 1N5990, 3.9v, 0.5w
45	5010-08992-00	R94, R97, R100, R103, R106, R109	Resistor, 560Ω, 5%, 1/4w, C. F.
46	5010-09039-00	R56	Resistor, 10Ω, 5%, 1/4w, C. F.
47	5010-09534-00	W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, W19	Resistor, 0Ω, 5%, 1/4w, C. F.
48	5010-08991-00	R31, R32, R35, R52 R55, R68, R92, R146	Resistor, 4.7KΩ, 5%, 1/4w, C. F.
49	5010-09358-00	R54, R57, R58, R64, R66, R138-R145	Resistor, 1.0KΩ, 5%, 1/4w, C. F.
50	5010-09113-00	R79	Resistor, 33KΩ, 5%, 1/4w, C. F.
51	5010-08983-00	R7, R8, R10, R70, R80	Resistor, 3.3KΩ, 5%, 1/4w, C. F.
52	5010-09034-00	R11-R14, R25, R26, R53, R60, R65, R90	Resistor, 10KΩ, 5%, 1/4w, C. F.
53	5010-09086-00	R81	Resistor, 6.8KΩ, 5%, 1/4w, C. F.
54	5010-09363-00	R3	Resistor, 5.6KΩ, 5%, 1/4w, C. F.
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.
562	5012-09037-00	R113, R116, R119, R122, R125, R128, R131, R134	Resistor, 0.4Ω, 5%, 3w, Wire-Wnd.
57	5010-08993-00	R36-R51, R95, R98, R101, R104, R107, R110	Resistor, 68Ω, 5%, 1/2w, C. F.
582	5012-10860-00	R82-R89	Resistor, 27Ω, 5%, 2w, C. F.
59	Not Used		
60	Not Used		
61	5010-10987-00	R19	Resistor, 56KΩ, 5%, 1/4w, C. F.
62	5010-10003-00	R62, R63	Resistor, 390Ω, 5%, 1/4w, C. F.
63	5010-10171-00	R67	Resistor, 56Ω, 5%, 1/4w, C.F.
64	5010-10170-00	R69	Resistor, 47Ω, 5%, 1/4w, C. F.
65	5010-09160-00	R59, R61, W12, W13	Resistor, 220Ω, 5%, 1/4w, C. F.
66	5010-09416-00	R33, R34, R71-R78, R135-R137	Resistor, 470Ω, 5%, 1/4w, C. F.
67	5010-09179-00	R9	Resistor, 3.3MΩ, 5%, 1/4w, C. F.
68	Not Used		
69	5010-10361-00	R111, R114, R117, R120, R123, R126, R129, R132	Resistor, 1.2KΩ, 5%, 1/2w, C. F.
70	Not Used		
71	Not Used		
72	5010-09120-00	R17	Resistor, 270KΩ, 5%, 1/4w, C. F.
73	5010-09333-00	R15, R16, R18	Resistor, 180KΩ, 5%, 1/4w, C. F.
74	5010-09324-00	R29, R30	Resistor, 27KΩ, 5%, 1/4w, C. F.
75	5010-09269-00	R20, R21	Resistor, 12KΩ, 5%, 1/4w, C. F.
76	5010-09356-00	R27, R28	Resistor, 820Ω, 5%, 1/4w, C. F.
77	5019-09783-00	SR18	SIP, 9R, 10-pin, 6.8KΩ, .125w/R, 5%
78	5019-09362-00	SR3, SR15, SR17, SR19, SR20	SIP, 9R, 10-pin, 4.7KΩ, .125w/R, 5%
79	5019-09808-00	SR4, SR6, SR11	SIP, 9R, 10-pin, 560Ω, .125w/R, 5%
80	5019-09785-00	SR16	SIP, 9R, 10-pin, 2.2KΩ, .125w/R, 5%
81	5019-10472-00	SR14	SIP, 9R, 10-pin, 3.3KΩ, .125w/R, 5%
82	5019-09669-00	SR8	SIP, 9R, 10-pin, 1.0KΩ, .125w/R, 5%
83	5019-09780-00	SR9, SR10	SIP, 4R, 8-pin, 1KΩ, 5%
84	5019-09786-00	SR1, SR2	SIP, 5R, 6-pin, 4.7KΩ, .125w/R, 5%
85	5019-09792-00	SR5, SR7	SIP, 9R, 10-pin, 2.7KΩ, .125w/R, 5%
86	5060-10396-00	SRC1 - SRC5, SRC7 - SRC9	SIP, 8R, 8C,10-pin, 4.7KΩ & 470pfd
87	5010-08774-00	R22	Resistor, 22KΩ, 5%, 1/4w, C. F.
88	5043-08980-00	C14, C17-C21, C31, C32, C49-C56, C59, + 54 Bypass, marked B	Capacitor, 0.01 µfd, 50v(+80,-20%), Axial
89	5043-09845-00	C22, C23, C25, C27, C28	Capacitor, 1K pfd, 50v(±20%), Axial
90	5043-08996-00	C9, C70-75, C77, C78	Capacitor, 0.1 µfd, 50v(±20%), Axial
91	5040-09343-00	C8, C15	Capacitor, 10 µfd, Electr., 20v(±20%), Axial
92	5043-09844-00	C7	Capacitor, 47 pfd, 50v(±20%), Axial
93	5040-10974-00	C24, C26, C29	Capacitor, 100 µfd, Electr., 25v(+50,-10%), Axial
94	Not Used		
95	5045-09796-00	C60-C67	Capacitor, 0.1 µfd, Polycarbonate Rad., 100v(±10%)
96	5043-09065-00	C33-C40, C68, C69, C76, C10, C12	Capacitor, 470 pfd, 50v(±20%), Axial
97	5040-09545-00	C30	Capacitor, 22 µfd, Electr., 10v(+50,-10%), Axial
98	5041-09031-00	C58	Capacitor, 1 µfd, Tant., 25v(±20%), Axial
99	5043-09030-00	C16, C57	Capacitor, 0.047 µfd, 50v(±20%), Axial
100	Not Used		
101	5043-09492-00	C11	Capacitor, 100 pfd, ceramic,100v(±20%)
102	Not Used		
103	5048-10992-00	C13	Capacitor, 4700 pfd, ceramic,50v(±10%)
104	5551-09822-00	L1-L3	Inductor, 4.7 µH, 3A
105	5641-09312-00} 5641-09653-00}	SW1, SW2	Switch, Pushbutton, DPDT, 100v, 5A
106	5880-09022-00	B1-B3	Battery, Alkaline, 1.5v, AA
107	20-9491	W18, W19	Bus Wire, Jumper
108	5881-09021-00		Battery Holder, #171
109	5700-10176-00		IC Socket, 28 pin
a)	A-5343-567-1	U26	IC, Game ROM 2, 27128
b)	A-5343-567-2	U27	IC, Game ROM 1, 27256
c)	A-5343-567-4	U21	IC, Sound ROM 1, 27256
d)	A-5343-567-3	U22	IC, Sound ROM 2, 27256
110	5700-08985-00		IC Socket, 40 pin
a)	5400-09150-00	U15	IC, µProcessor, 6802
b)	5400-09150-00	U24	IC, µProcessor, 6802
111	5824-09248-00	TP1, TP2	Test Point
112 - 115	Not Used		
116	20-9229		Thermal Compound
117	5580-08994-01	K1	Relay, 4-pole, 40Ω, 6v
118	5791-10862-09	1J1, 1J2, 1J4-1J8, 1J10-1J12, 1J17-1J19	Connector, 9 pin (Hdr)
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:

1. For Schematic, refer to drawing #16-9019.
2. Items 56 and 58 (resistors) must be mounted 1/8" above PCB surface.
3. Standard Jumper: W1, W2, W4, W5, W7, W8, W11, W14, W16, W17, W19.



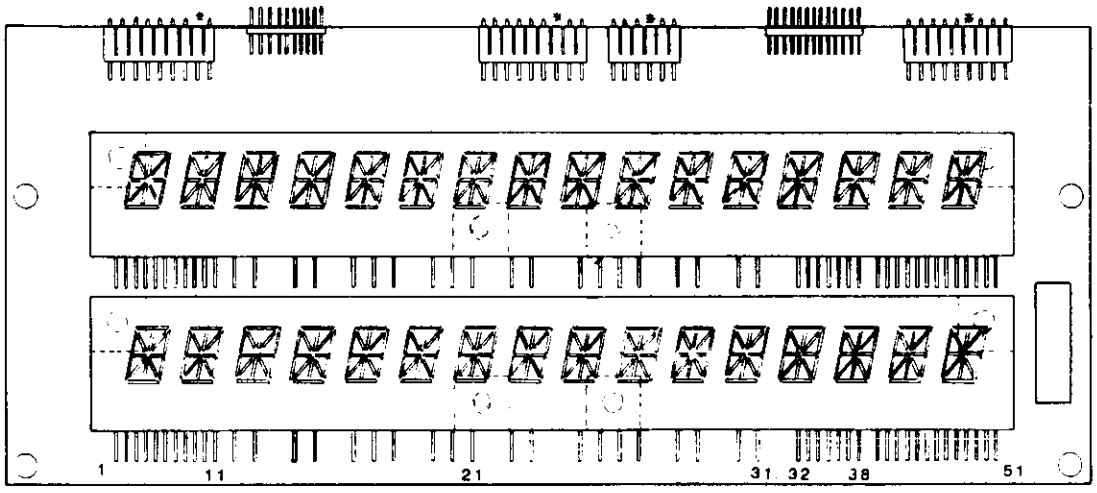
System 11B CPU Board (D-11883) Parts Information



Master Display Board

p/n D-12232-1

Part No.	Ckt Designator	Description
5760-12306-00		Bare P.C. Board
5670-12308-00	DSPL1, DSPL2	Display, 16-Character, A/N
5310-09882-00	U1, U2, U5, U6	I.C. 4001
5310-08975-00	U7 - U12	I.C. 4049
5680-08968-00	U13, U14, U17, U18	I.C. 6184, Anode Driver
5680-08969-00	U15, U16, U19, U20	I.C. 7180, Cathode Driver
5040-09343-00	C1	Axial Cap, 10 µfd, 20v, ±20%
5043-08980-00	Bypass	Axial Cap, 0.01µfd, 50v, +80, -20%
5075-09135-00	D1, D2	Zener, 1N4740A, 10v, 1w
5791-10869-09	J1, J2, J5	9-pin Header, Rt. Angle
23-6634		Cover, Display
5791-10869-06	J7	6-pin Header, Rt. Angle
5791-10851-00	J3	26-pin Header, Rt. Angle
5010-08773-00	R1-R8, R19-R35, R41, R43, R45, R71	Resistor, 18KΩ, 1/4w, 5%
5010-10258-00	R38, R52	Resistor, 1MΩ, 1/4w, 5%
5010-10927-00	R36, R39, R40, R42, R47, R48, R50, R51, R54, R56, R57, R59, R64, R65, R67, R68	Resistor, 8.2KΩ, 1/2w, 5%
5010-08981-00	R37, R44, R46, R49 R55, R61, R63, R66	Resistor, 10KΩ, 1/2w, 5%
03-8088-1	Support	Support, Display



16-Character Display Glass

p/n 5670-12308-00

Lamp Board ("3-C")
p/n C-12000

Part No.	Description
5768-12245-00	PC Board
24-8767	Twist Lamp Socket
24-8768	Bulb, #555 (6.3v, .25A)
5070-09054-00	Diode, 1N4004, 1.0A
5791-10871-05	Header, 5-pin sq post

Lamp Board ("8-I")
p/n C-12098

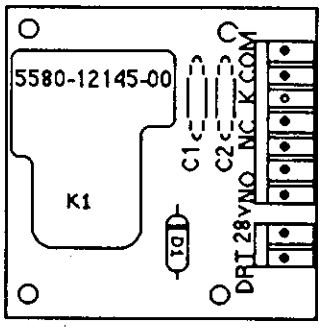
Part No.	Description
5768-12288-00	PC Board
24-8804	V-Wedge Lamp (#555) Skt.
24-8768	Bulb, #555 (6.3v, .25A)
5070-09054-00	Diode, 1N4004, 1.0A
5791-10871-10	Header, 10-pin sq post

Lamp Board ("16-C")
p/n D-12221

Part No.	Description
5768-12311-00	PC Board
24-8767	Twist Lamp Socket
24-8768	Bulb, #555 (6.3v, .25A)
5070-09054-00	Diode, 1N4004, 1.0A
5010-09534-00	Resistor, 0Ω

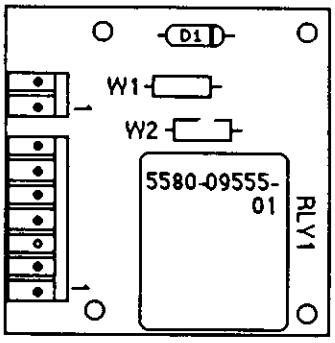
Lamp Board ("5-C")
p/n C-12315

Part No.	Description
5768-12334-00	PC Board
24-8767	Twist Lamp Socket
24-8768	Bulb, #555 (6.3v, .25A)
5070-09054-00	Diode, 1N4004, 1.0A
5791-10871-07	Header, 7-pin sq post



Motor Relay Board Assy (Center Ramp Motor)
p/n C-11902-1

Part No.	Description
5768-12221-00	PC Board
5070-09054-00	Diode, 1N4004, 1.0A
5580-12145-00	Relay, 24vdc, 30A
5791-12273-02	Header, 2-pin sq post (J1)
5791-12273-07	Header, 7 pin sq post (J2)

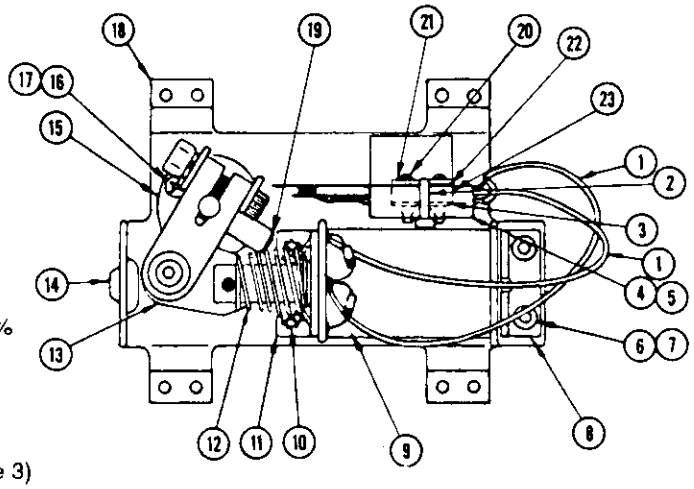


Relay Board (Sol. 11 Gen. Illum)
p/n C-11998-1

Part No.	Description	
5768-12243-00	PC Board	
5070-09054-00	Diode, 1N4004, 1.00A	(D1)
5580-09555-01	Relay, 24vdc, 30A	(K1)
5010-09534-00	Resistor, 0Ω	(W1, W2)
5791-12273-02	Header, 2-pin sq post	(J1)
5791-12273-07	Header, 7-pin sq post	(J2)

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 µFd, 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 (* - 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
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, P-PH-A
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

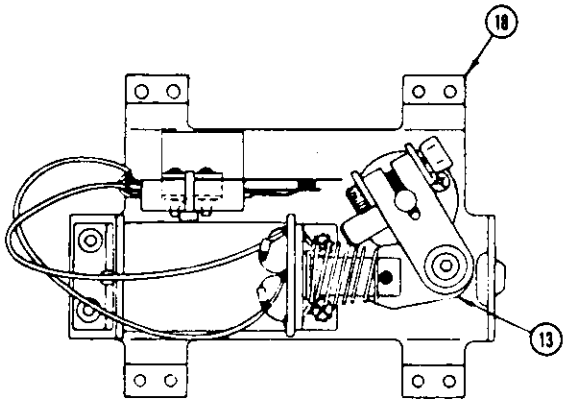
Flipper Assembly Notes:

1. 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).
2. 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 (± .015) inch. Adjustment of the EOS Switch must be made at a minimum distance of 0.25 inch from the switch body.
3. Flipper Assembly C-11626-R-8 (upper right flipper on Mini-Playfield) and C-11626-L-8 (upper left flipper on Main Playfield) use a Flipper Coil, FL-11753/50V.
4. All moving elements of the assembly must operate freely, with no evidence of binding.
5. The large end of the Coil Plunger Spring (item 12) must fit within the four lugs of the Solenoid Bracket.
6. For coil replacement, remove the Solenoid Bracket (item 11) to prevent screw damage.
7. Use Loctite™ 242 when reattaching screws to the Flipper Stop Assembly, the Solenoid Bracket, and the Flipper Bushing.
8. When replacing the Bumper Plug (item 14) to restore proper flipper operation, readjust the flipper paddle and shaft position.
9. 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.

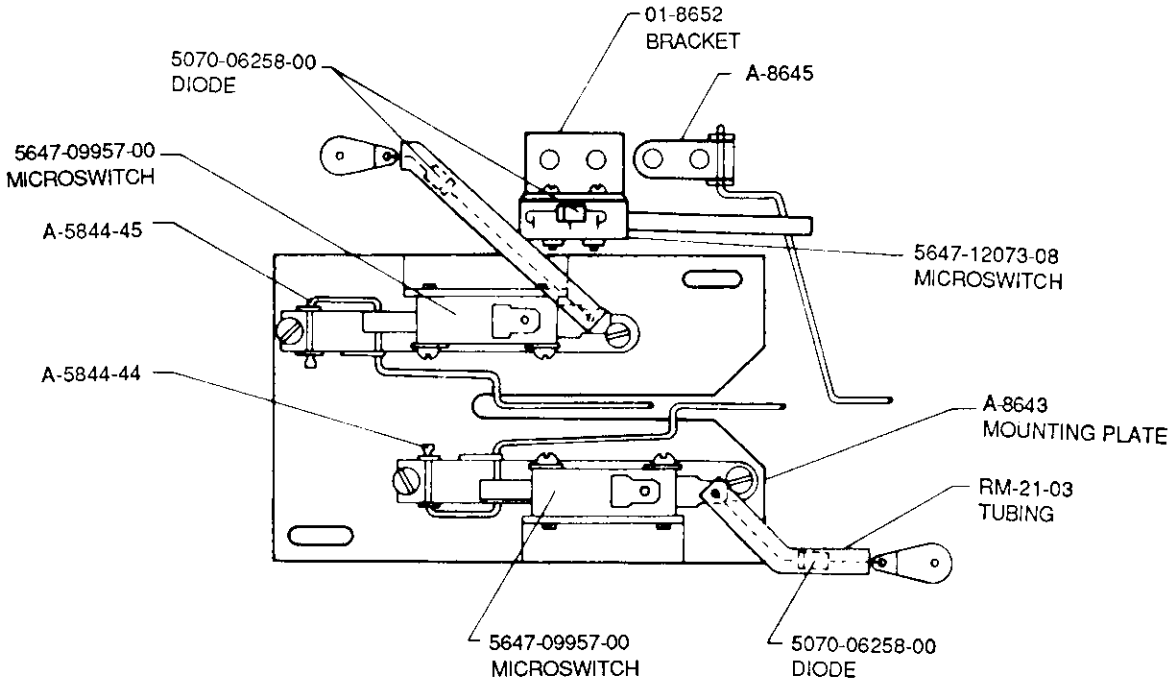
Lower Left Flipper

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
g)	B-10657-L	Flipper Crank Assembly, Left
1.)	01-8073-L	Flipper Crank, Left
18	C-11627-L	Flipper Base Assy, L.



Ball Trough Switches

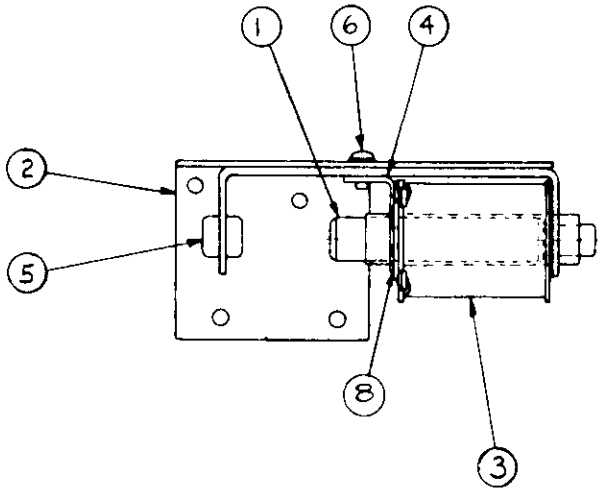
(viewed from underside of playfield to show locations)

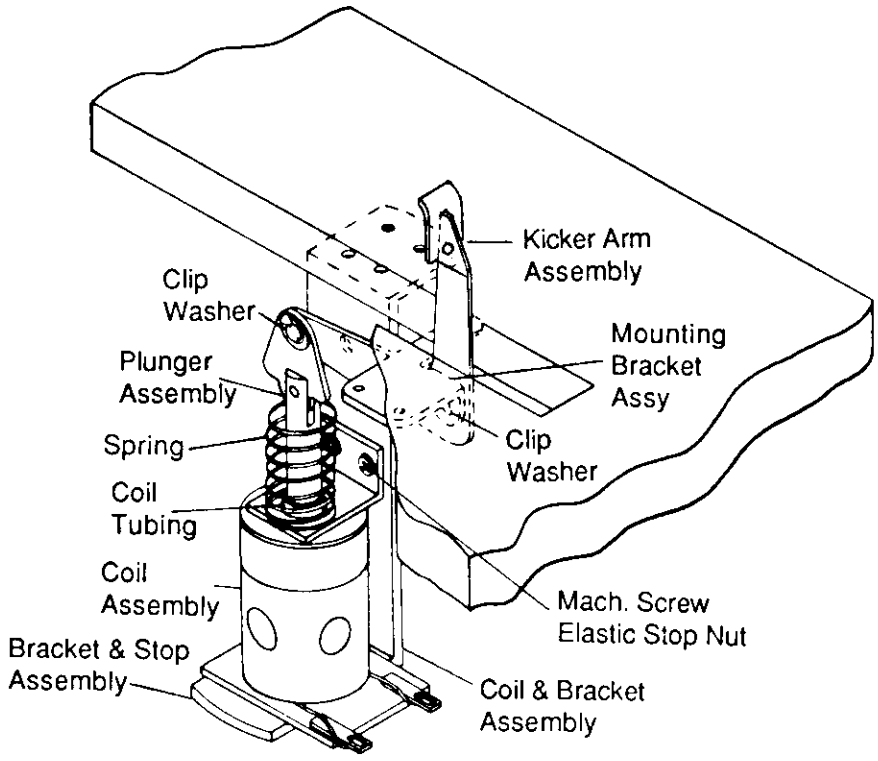
Part No.	Description
B-8644	Ball Trough Switch Plate Assy
A-5844-44	Switch Wire & Bracket Assy
A-5844-45	Switch Wire & Bracket Assy
A-8643	Bracket & Mounting Plate Assy
5647-09957-00	µswitch; Cntr & L Ball Trough
4004-01003-10	Mach. Screw, 4-40 x 5/8
4005-01005-02	Mach. Screw, 5-40 x 1/8
5070-06258-00	Diode, 1N4001, 1.0A
5825-09372-00	Solder Lug
RM-21-03	Insulating Tubing, #10 x 1.75
A-11680	Ball Trough Switch, Right
5647-12073-08	Submin. Switch
5070-06258-00	Diode, 1N4001, 1.0A
A-8645	Switch Wire & Bracket Assy

Knocker Assembly

p/n B-10686-2

Item	Part No.	Description
1	A-5387	Coil Plunger Assy
	02-2653	Coil Plunger
	03-6013	Bell Arm Ext.
2	B-7409-2	Mtg. Bracket Assy.
3	AE-26-1200	Coil Assy.
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





Left & Right Kicker Arm Assembly

p/n B-12283

& Associated Parts

Part No.	Description
12-6227	Clip, Hairpin
A-7986	Kicker Arm Assembly
A-8050-1	Plunger Assembly
02-3407-2	Coil Plunger
20-8716-5	Roll Pin, 1/8 x 7/16
03-8085	Armature Link
4700-00073-00	Flat Washer, 1/2 o.d. x 9/32 i.d. x 21 ga.
A-5653	Mounting Bracket Assy

Associated Parts for Left Kicker

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

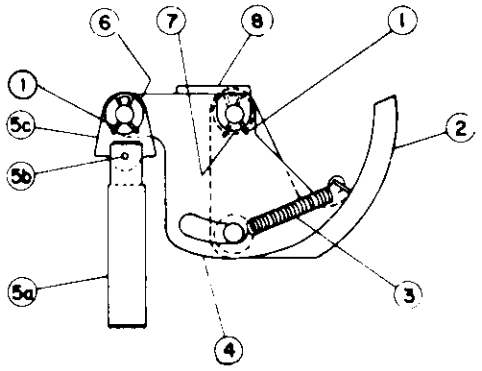
Associated Parts for Right Kicker

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

Ball Shooter Lane Feeder

C-9638-3

& Associated Parts



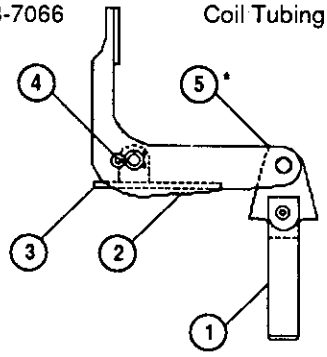
Item	Part No.	Description
1	12-6227	Clip, Hairpin
2	A-8247	Eject Cam Assy
3	10-362	Ejector Spring (Plain)
4	A-6949-L	Spring Plate Assy
5	A-8050-1	Coil Plunger Assy
a)	02-3407-2	Coil Plunger
b)	20-8716-5	Roll Pin
c)	03-8085	Armature Link
6	4700-00030-00	Flat Washer, 17/64 x 1/2 x 15 ga
7	4700-00103-00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

Associated Parts

B-9362-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-23-800	Coil Assembly
03-7066	Coil Tubing

BL & TL Lock Kickbig

p/n B-11395-1



Item	Part No.	Description
1	A-5103	Coil Plunger Assy
a)	02-2364	Coil Plunger
b)	03-8085	Armature Link
c)	20-8716-5	Roll Pin, 1/8 x 7/16
2	A-5652-1	Kicker Crank Assy
3	A-11396	Kicker Mounting Assy
4	12-6227	Hairpin Clip
5*	4700-00030-00	Flat Washer, 17/64 x 1/2 x 15 ga.

* Not Shown

Associated Parts for TL Kickbig

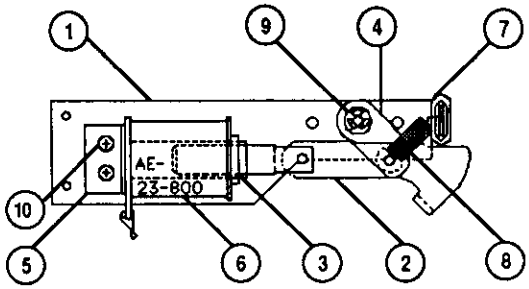
B-9362-R-1	Coil & Bracket Assy
B-7572-1	Brkt. & Stop Assy
01-8-508-S	Coil Retaining Brkt.
4006-01017-06	Mach. Screw, 6-32 x 3/8
4406-01119-00	Nut, 6-32 ESN
AE-26-800	Coil Assy
03-7066	Coil Tubing

Associated Parts for BL Kickbig

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

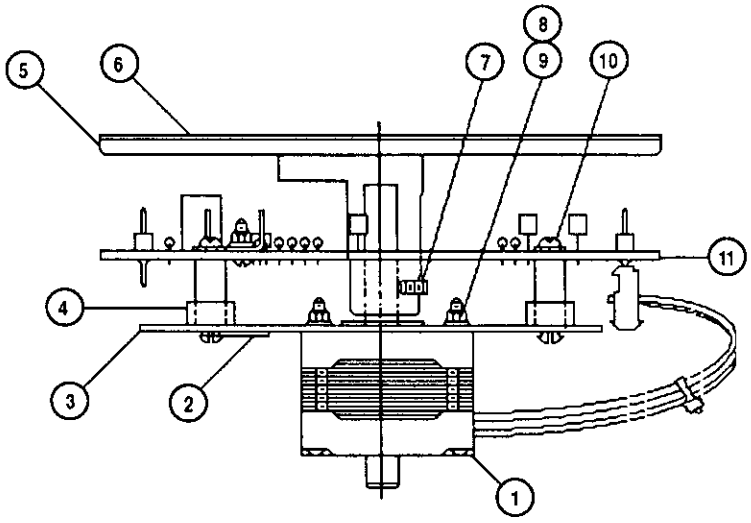
Outhole Kicker Assembly

p/n B-8039-2



Item	Part No.	Description
1	A-6378	Mounting Plate Assy
2	A-8335	Coil Plunger Assy
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 Assy
5	A-8038	Coil Stop Assy

Item	Part No.	Description
6	AE-23-800	Coil Assy
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



Draw Poker Assembly

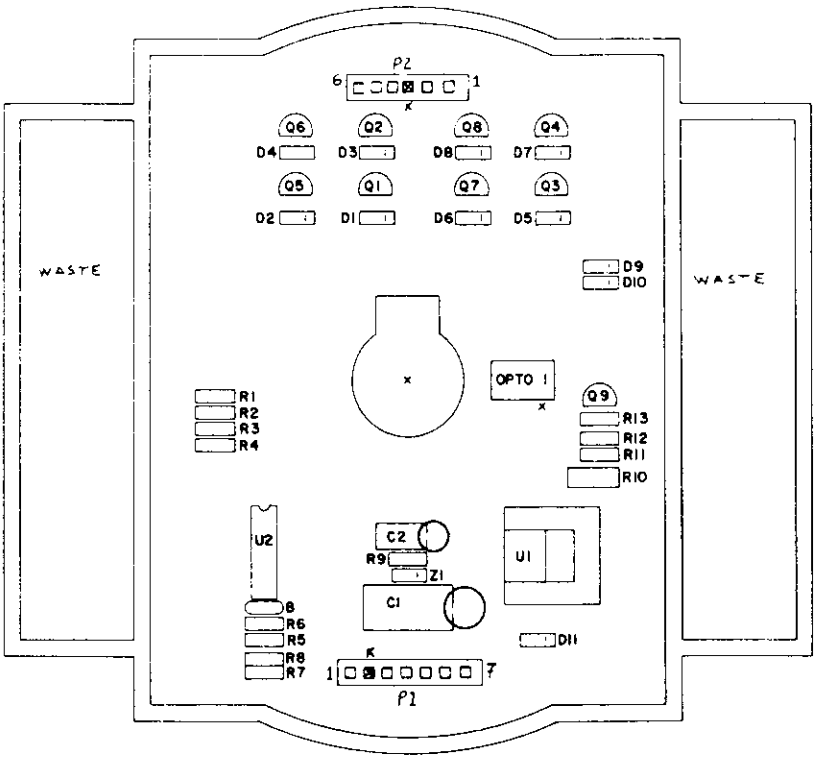
p/n C-12036-1

Item	Part No.	Description	Item	Part No.	Description
1	B-12088	Motor & Connector Assy	4	03-8022-1	Spacer
a)	03-7520-2	Ty-Wrap, Nylon	5	03-8161	Carousel Wheel
b)	14-7948	Stepper Motor	6	31-1473-1	Decal, Carousel Wheel
c)	5792-12275-06	6R MT/END 26/156	7	4006-01076-04	Mach. Screw, 6-32 x 1/4
d)	5823-10820-00	PLZ Key Mt .156"	8	4701-00023-00	Lockwasher, #5 Split
2	16-8587-932	Label, Carousel Adjust.	9	20-9570	Hex Nut, M3x .5
3	B-12035	Motor Plate Assy	10	4006-01003-06	Mach. Screw, 6-32 x 3/8
			11	D-12045	Control Assy, Stepper Mtr.

Ramp Lifting Motor Assembly

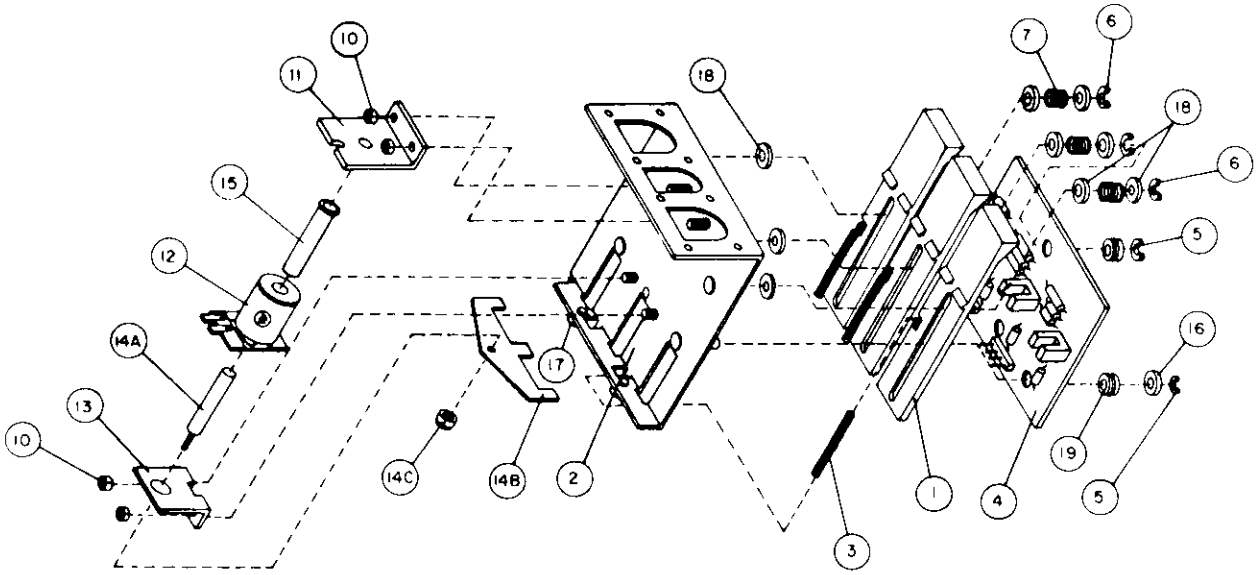
p/n C-12281

Item	Part No.	Description	Item	Part No.	Description
1	A-12342	Motor Cam Assy	8	20-8712-25	"E" Ring, 1/4" Shaft
2	01-8932	Motor Mtg. Bracket	9	4002-01005-06	Mach. Screw, 2-56 x 3/8
3	02-4179	Link Spacer Bushing	10	4006-01003-04	Mach. Screw, 6-32 x 1/4
4	02-4346	Lift Arm Pin	11	4008-01076-06	Set Screw, 8-32 x 3/8
5	03-8210	Lift Arm	12	4410-01132-00	Nut, 10-32 ESN
6	B-11571-3	Motor Sub-Assy	13	4700-00021-00	Flatwasher, 13/64 x 7/16 x 21ga.
a)	14-7941-4	Motor, 11RPM, 24 VAC	14	4700-00027-00	Flatwasher, 1/4 x 1/2 x 21 ga.
b)	5791-09111-00	3P1396 03-09-203	15	5647-12073-07	Sub-Miniature Switch
c)	5820-09080-00	PM 1190 02-09-2101	16	4701-00024-00	Lockwasher, #2 Split
7	20-8712-18	"E" Ring, 3/16" Shaft			



Wheel Opto Positioner
PC Board Assembly
p/n D-12045

Part No.	Ckt Designator	Description
5768-12270-00		Bare P. C. Board
5250-09157-00	U1	IC, Voltage Regulator, 7805
5370-12272-00	U2	IC, Quad Comp, LM339
5490-10159-00	Opto 1	Opto Interruptor Module
5160-08938-00	Q1 - Q4	Transistor, 2N4401
5190-09016-00	Q5 - Q8	Transistor, 2N4403
5190-10270-00	Q9	Transistor, 2N3906
5070-06258-00	D1 - D10	Diode, 1N4001
5070-08919-00	D11	Diode, 1N4148
5075-09059-00	Z1	Zener Diode, 3.9V
5040-12298-00	C1	Capacitor, 100µfd, Electr, 40v (+50%,-10%), Axial
5040-09365-00	C2	Capacitor, 1µfd,10v (+50%,-10%), Axial
5043-08980-00	B	Capacitor, 0.01µfd,50v, Axial
5010-08998-00	R1 - R4	Resistor, 2.2K, 1/4w, 5%, CF
5010-09034-00	R5, R6, R9	Resistor, 10K, 1/4w, 5%, CF
5010-08991-00	R7, R8	Resistor, 4.7K, 1/4w, 5%, CF
5010-08930-00	R10	Resistor, 470Ω, 1/2w, 5%, CF
5010-09324-00	R11	Resistor, 27K, 1/4w, 5%, CF
5010-09356-00	R12	Resistor, 820Ω, 1/4w, 5%, CF
5010-09162-00	R13	Resistor, 100K, 1/4w, 5%, CF
5791-10871-06	P2	Connector, 6 pin (Hdr)
5791-10871-07	P1	Connector, 7 pin (Hdr)
5705-09042-00		Heat Sink (U1)
20-9229		Heat Sink Compound
4005-01016-07		Mach. Screw, 5-40 x 7/16
4701-00023-00		Lockwasher, #5 split
4405-01117-00		Hex Nut, 5-40



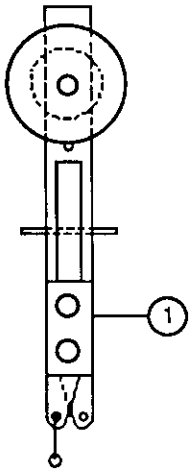
BL, BR, & TL 3-Bank Drop Target

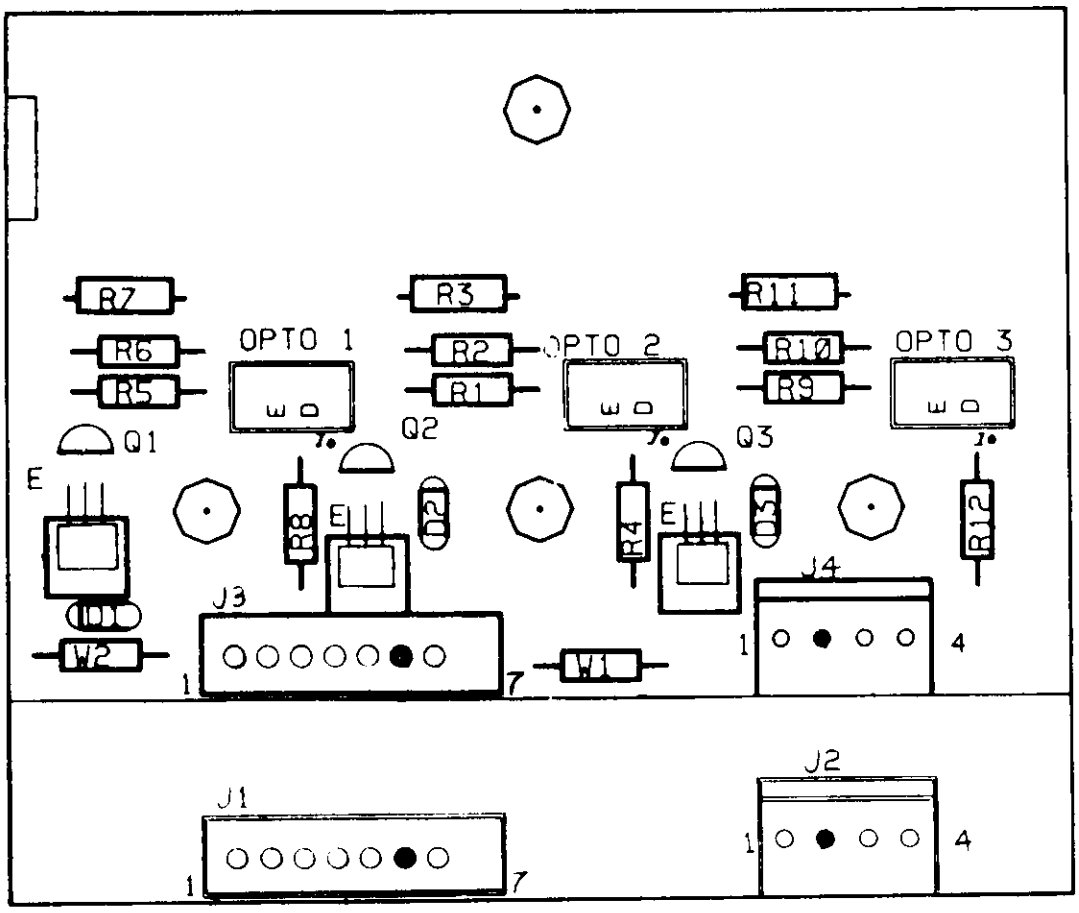
p/n C-11223-1

Item	Part No.	Description	Item	Part No.	Description
1	03-8036	Target, Plain	12	AE-26-1200	Coil Assy
2	B-11224	3-Bank Tgt Sub-Assy	13	01-8413	Bracket Coil Mtg
3	10-364	Spring - Extension	14	A-11389	Plunger & Reset Plt Assy
4	C-11318-1	3-Drop Target Opto Assy	A)	02-3972-1	Plunger
5	20-8712-18	"E" Ring, 3/16" Shaft	B)	01-8408	Reset Plate, 3-Bank
6	20-8712-25	"E" Ring, 1/4" Shaft	C)	4410-01132-00	Nut, 10-32 ESN
7	10-392	Spring-Compression	15	03-7066-4	Coil Tubing
8	Not Used		16	4700-00016-00	Flat Washer, 3/16 x 7/16 x 17 ga.
9	Not Used		17	4008-01016-10	Mach. Screw, 8-32 x 5/8
10	4408-01119-00	Nut, 8-32 ESN	18	4700-00072-00	Flat Washer, 17/64 x 1/2 x 21 ga.
11	A-11397	Stop Bracket Assy	19	23-6626	Rubber Grommet

Standup Target Assembly

Item	Part No.	Description
1	B-11854-4	Standup Target (Red) (Including Diode)





3-Bank Opto Board

p/n C-11318-1

Item	Part No.	Ckt Designation	Description
1	5768-12069-00		Bare PCB Board
2	5490-10159-00	Opto 1- Opto3	Opto Interruptor, MDL, S/G
3	16-8850-202		PCB ID Label
4	5010-08930-00	R3, R7, R11	Resistor, C.F., 470 Ω, 1/2w, 5%
5	5010-09534-00	W1, W2	Resistor, 0Ω, 1/4 w
6	5010-09356-00	R4, R8, R12	Resistor, C.F., 820Ω, 1/4w, 5%
7	5010-09162-00	R1, R5, R9	Resistor, C.F., 100KΩ, 1/4w, 5%
8	5010-09324-00	R2, R6, R10	Resistor, C.F., 27KΩ, 1/4w, 5%
9	5070-08919-00	D1 - D3	Diode, 1N4148, 150 MA
10	5190-10270-00	Q1 - Q3	Transistor, TO-92, 2N3906, PNP
12	5791-10871-04	J2 (J4 Not Used)	Connector, 4-pin Hdr, Sq Pin .156
13	5791-10871-07	J1 (J3 Not Used)	Connector, 7-pin Hdr, Sq Pin .156

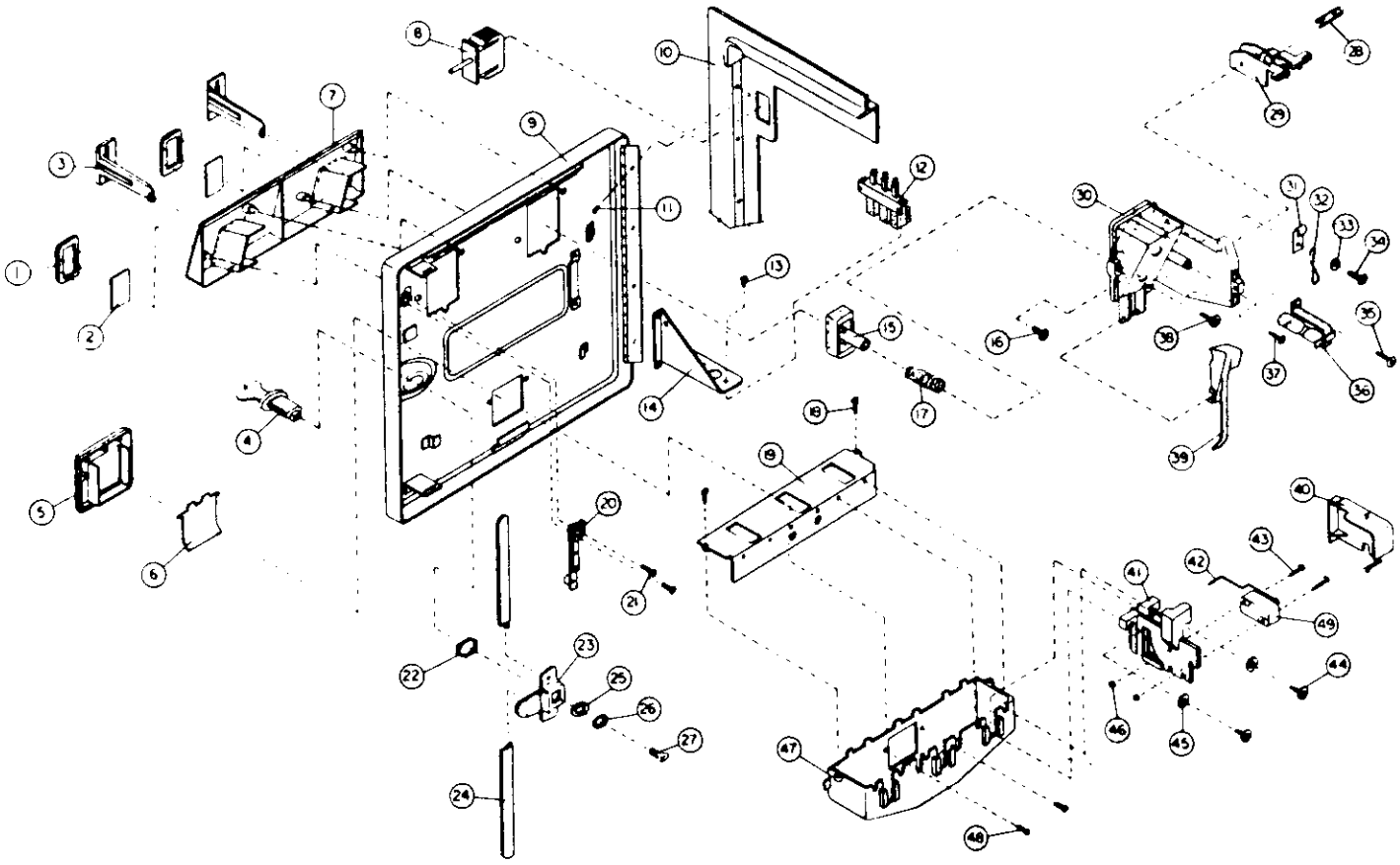
Coin Door Assembly

2-Chute Door, p/n 09-17002-x
3-Chute Door, p/n 09-17003-x
("x" is the country designator)

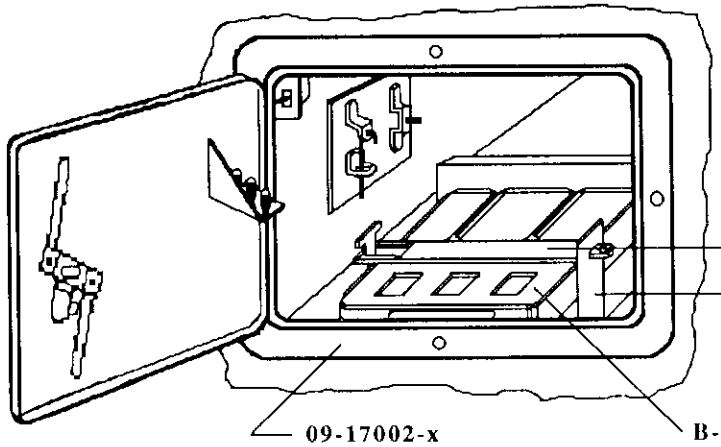
Item	Part No.	Description	Quantity
1	27-1038	Button Cover	2 or 3
2	27-1041-1→41	Price Panel	2 or 3
3	27-1026-1→13	Coin Entry Plate	2 or 3
4	27-1016	Lock Assembly	1
5	27-1061	Coin Return Bezel	1
6	27-1062	Coin Return Flap	1
7	27-1021	Button Housing - 2-slot	1
	27-1022	Button Housing - 3-slot	1
8	27-1111	Interlock Switch	1
9	27-1006	Coin Door - 2-slot	1
	27-1007	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	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
28	27-1089	R-Ring	1
29	27-1083	Retainer	1
30	27-1081	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	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	Coin Return Box	1
48	27-1078	M/C Screw, 6-32 x 3/8	2
49	27-1092	Microswitch	2 or 3

Coin Door Assembly

2-Chute Coin Door, p/n 09-17002-x
3-Chute Coin Door, p/n 09-17003-x
("x" is the country designator)



Pinball Front Box



01-8898 Cash Latch Bar

01-8897 Cashbox Cradle

09-17002-x
2-Chute Coin Door

09-17003-x
3-Chute Coin Door

(x=Coin Designation)

B-12322-1 Cashbox

Left Ramp Assembly
p/n D-12277

Part No.	Description
A-12238	Sub-Mini Switch Assy
a) 5070-06258-00	Diode, 1N4001
b) 5647-12073-13	Micro Switch
H-12370	Ramp Switch Cable
01-8774	Switch Bracket
01-8795	Ramp Flap
01-8928	Ramp Mounting Brkt.
01-8929	Connecting Spring
03-8044-9	Mini Post TR-Red
03-8197	Ramp, Left
07-6688-17N	Rivet, 1/8 x 5/32, Nickel
07-6688-19N	Rivet, 1/8 x 7/32
23-6535	Rubber Bumper
31-1471-2	Decal - Left Ramp
31-1471-3	Decal - Back Panel
4002-01005-06	Mach. Screw, 2-56 x 3/8
4106-01019-08	SM Screw, #6 x 1/2
4700-00003-00	Flat Washer, 1/8 x 9/32 x 21 ga.
4701-00024-00	Lockwasher, #2 Split

Right Ramp Assembly
p/n D-12276

Part No.	Description
A-12238	Sub-Mini Switch Assy
a) 5070-06258-00	Diode, 1N4001
b) 5647-12073-13	Micro Switch
H-12370	Ramp Switch Cable
01-8774	Switch Bracket
01-8795	Ramp Flap
01-8928	Ramp Mounting Brkt.
01-9077	Connecting Spring
01-9014	Ball Deflector Plate
03-8196	Ramp, Right
07-6688-17N	Rivet, 1/8 x 5/32, Nickel
07-6688-19N	Rivet, 1/8 x 7/32
31-1471-1	Decal - Right Ramp
31-1471-3	Decal - Back Pane
4002-01005-06	Mach. Screw, 2-56 x 3/8
4700-00003-00	Flat Washer, 1/8 x 9/32 x 21 ga.
4701-00024-00	Lockwasher, #2 Split

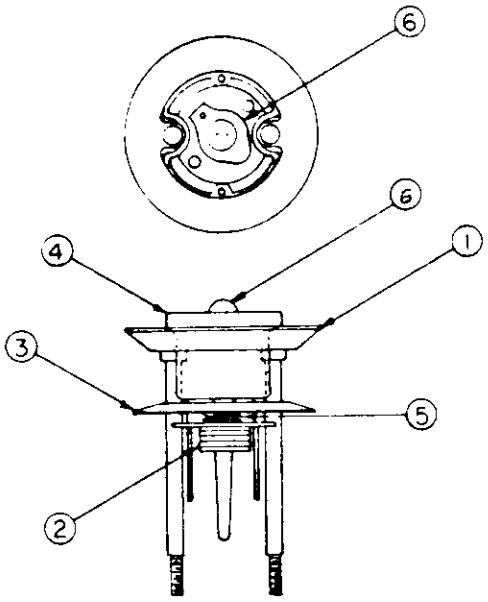
Center Ramp Assembly
p/n D-12275

Part No.	Description
B-12156	Single Flash Lamp Assy
H-12372	Flasher Cable
H-12373	Cen/Rite Flash Cable
H-12374	Center Flash Cable
01-8966-L	Ball Deflector, L
01-8966-R	Ball Deflector, R
01-8972	Ramp Protector
03-6047-1	Spacer, 1/4"
03-8149-12	Mini Dome Insert T-ORG
03-8195	Center Ramp
07-6688-21N	Rivet, 1/8 x 9/32
4106-01004-12	SM Screw, #6 x 3/4
4700-00003-00	Flat Washer, 1/8 x 9/32 x 21ga.

Jet Bumper (Lwr, R, L)

p/n B-9414-2

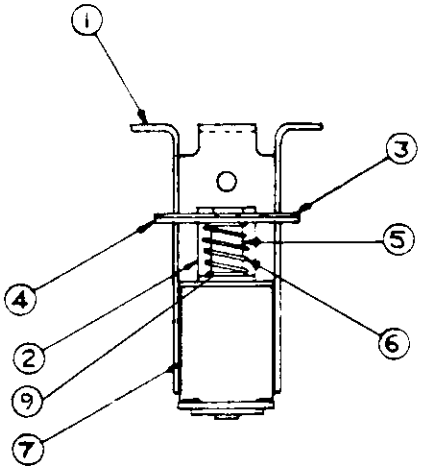
Item	Part No.	Description
1	A-4754	Bumper Ring Assy
2	03-6009-A5	Bumper Base-Wht
3	03-6035-6	Bumper Wafer-Yel
4	03-7443-5	Bumper Body-Wht
5	10-7	Spring-Jet Bumper
6	A-11199	Socket & Bulb Assy



Jet Bumper Coil Assembly

p/n B-9415-1

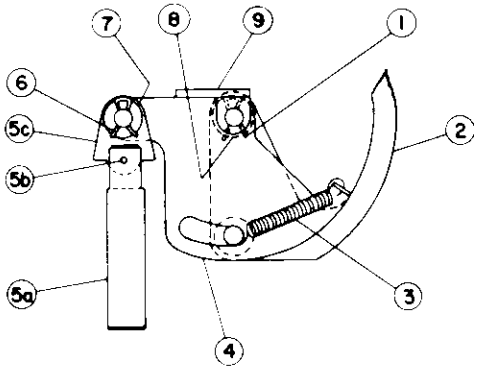
Item	Part No.	Description
1	B-7417	Bracket & Stop Assy
2	01-1747	Coil Retaining Bracket
3	01-5492	Armature Link, Steel
4	01-5493	Armature Link, Bakelite
5	02-3406-1	Coil Plunger
6	10-326	Armature Spring
7	AE-23-800	Coil Assy
8	4006-01017-04	Mach. Screw, 6-32 x 1/4
9	03-7066	Coil Tubing



TR Eject Hole Arm Assembly

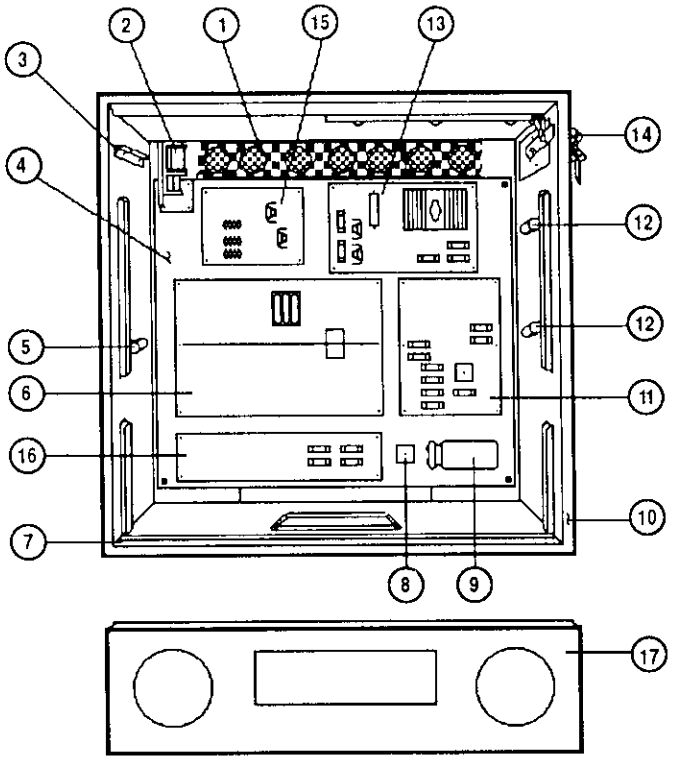
p/n B-9361-R-6

Item	Part No.	Description
1	A-6949-R	Spring Plate Assy
2	A-6950-R	Mounting Bracket Assy
3	A-7471-R	Eject Cam Assy
4	A-8050	Plunger Assy
5	10-320	Spring-Eject (Red)
6	12-6227	Hairpin Clip
7	4700-00030-00	Flat Washer,17/64 x 1/2 x 15 ga.
8	4700-00103-00	Flat Washer,17/64 x 1/2 x 28 ga.



Associated Parts for TR Eject

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



Backbox Parts List

Item	Part No.	Description	Item	Part No.	Description
1	01-6645	Venting Screen	11	D-12247-559*	Aux. Pwr Driver Board
2	B-10686-2*	Knocker Assy	12	01-8084	Insert Stop Bracket
3	A-7984	Upr Insert Bd Hinge Assy	13	D-12246*	Power Supply Assy
4	D-12184-2	PCB Plate Assy	14	20-9549	Cam Lock, 3/4"D x 27/32"L
5	A-10815	Lwr Insert Bd Hinge Assy	15	D-12338-567*	Audio Board Assy
6	D-11883-567*	System 11B CPU Board	16	D-12313-567*	Backbox Interconnect Bd
7	01-8569	Lwr Spkr Panel Bracket	17	D-12418	Display/Speaker Panel Assy
8	5100-09418-00	Bridge Rectifier, 100v,35A	a)	31-1420-567	Cover, Displ/Spkr Pnl Assy
9	5040-09051-00	Capacitor, 30,000 µFd, 25v	b)	31-1422-554	Speaker Grill
10	11-858-567	*JOKERZ!* Backbox	c)	D-12232-1*	Master Display PC Board Assy

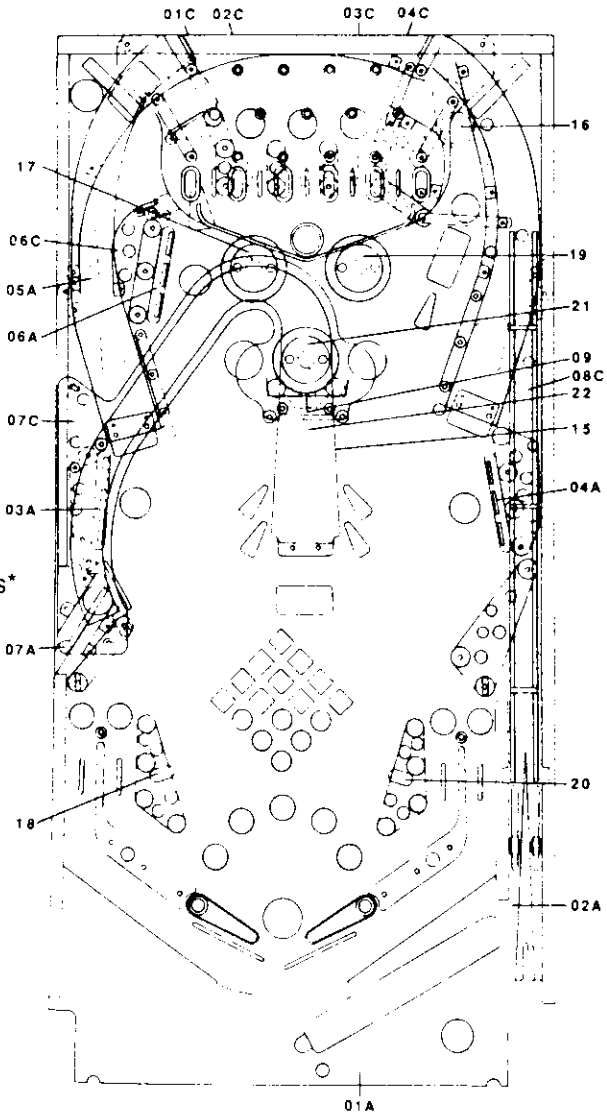
* Refer to Individual Unit's Parts List

Miscellaneous *JOKERZ!* Parts

A-8552-553	Backglass Assy
31-1357-567	Backglass, *JOKERZ!*
B-12322-1	Domestic Cash Box Assy
03-7960-567	Playfield Mylar
08-7028-T	Glass-Playfield
20-9347	Toggle Latch
20-9518	Backbox Hinge
31-1470	Start Button Decal
31-1471	Playfield Decal Set
31-1472	Ramp Deacal Set
31-1473	Wheel & Gate Decal Set
567-IN	*JOKERZ!* Insert
01-6571	Hinge Mtg Bracket, Insert Board
01-6655	Latch-Insert Board
01-6652	Stop Bracket
31-1006-557	Plastics Set, *JOKERZ!*
31-1008-557	Bottom Arch (Screened)
31-1009-557	Shooter Plate (Screened)
31-1462-567	Spin Target Decal Set
31-1463-567	Drop Target Decal Set
31-1464-567	Stationary Target Decal
5795-09453-00	Ribbon Cbl., 20-Conductor, 12"
5795-10938-27	Ribbon Cable,26-Conductor,27"

Solenoids/Flashers

Item	Part No.	Description
01A	AE-23-800	Outhole Kicker
01C	#906/89 Flashlamps	Left UPF/"JO" Flashers
02A	AE-23-800	Ball Shooter Lane Feeder
02C	#906/89 Flashlamps	UPF/"KE" Flashers
03A	AE-26-1200	BL 3-Bank Drop Target
03C	#906/89 Flashlamps	UPF/"RZ" Flashers
04A	AE-26-1200	BR 3-Bank Drop Target
04C	#906/89 Flashlamps	Rt UPF/"!" Flashers
05A	AE-23-800	Top Left Kickbig
05C	#89 Flashlamps	DOUBLE-SCORE Flashers
06A	AE-26-1200	TL 3-Bank Drop Target
06C	#89/906 Flashlamps	TL Dr Tgt/Top Jokers Flashers
07A	AE-26-1500	BL Locking Kickbig
07C	# 906/89 Flashlamps	BL Dr Tgt/ Mid Jokers Flashers
08A	AE-26-1200	Knocker
08C	#906/89 Flashlamps	BR Dr Tgt/Lwr Jokers Flashers
09	#906/89 Flashlamps	Cntr Ramp/Jackpot Flashers
10	5580-12145-01	P'fld/Inst Bd Gen Illumin Relay s*
11	#89 Flashlamps	Wheel Flashers
12	5580-09555-01	Solenoid A/C Select Relay**
13	14-7948	Wheel (Coil B)
14	14-7948	Wheel (Coil A)
15	14-7944	Center Ramp Motor
16	AE-23-800	TR Eject
17	AE-23-800	Left Jet Bumper
18	AE-26-1500	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	#906 Flashlamps	Lifter Ramp Flashers
-	FL 11630/50VDC	Lower Left and Right Flipper



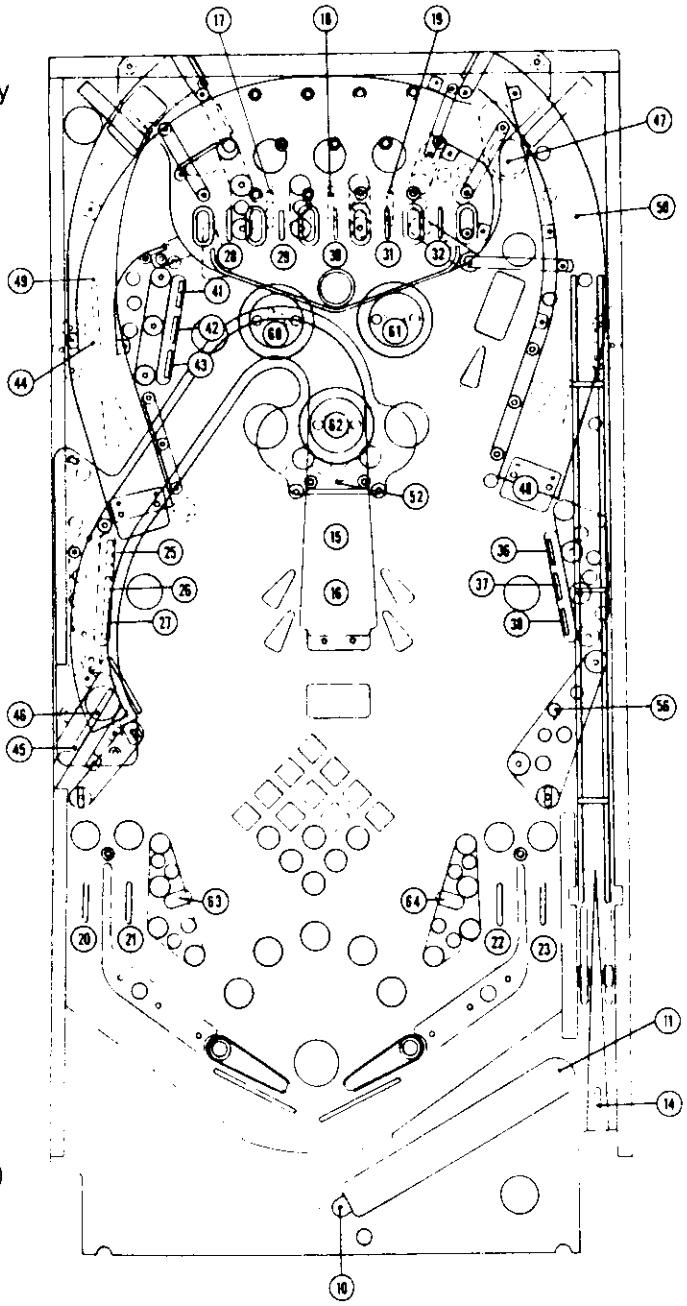
* - On Relay Board, C-11998-1, on Playfield and Insert Board
** - In backbox on Aux Power Driver Bd, D-12247

Rubber Parts

Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
A	23-6300	5/16" Ring	8	J	23-6313-1	Grommet	1
B	23-6301	3/4" Ring	3	K	23-6327	Ball Shooter Tip	1
C	23-6302	1" Ring	1	L	23-6519-4	Lg Red Flipper Ring	2
D	23-6303	1-1/4" Ring	2	M	23-6535	Bumper	20
E	23-6304	1-1/2" Ring	1	N	23-6552	Sleeving, Yellow	7
F	23-6305	2" Ring	3	P	23-6556	Sleeving, Black	5
G	23-6306	2-1/2" Ring	3	Q	23-6626	Grommet	9
H	23-6307	3" Ring	1				

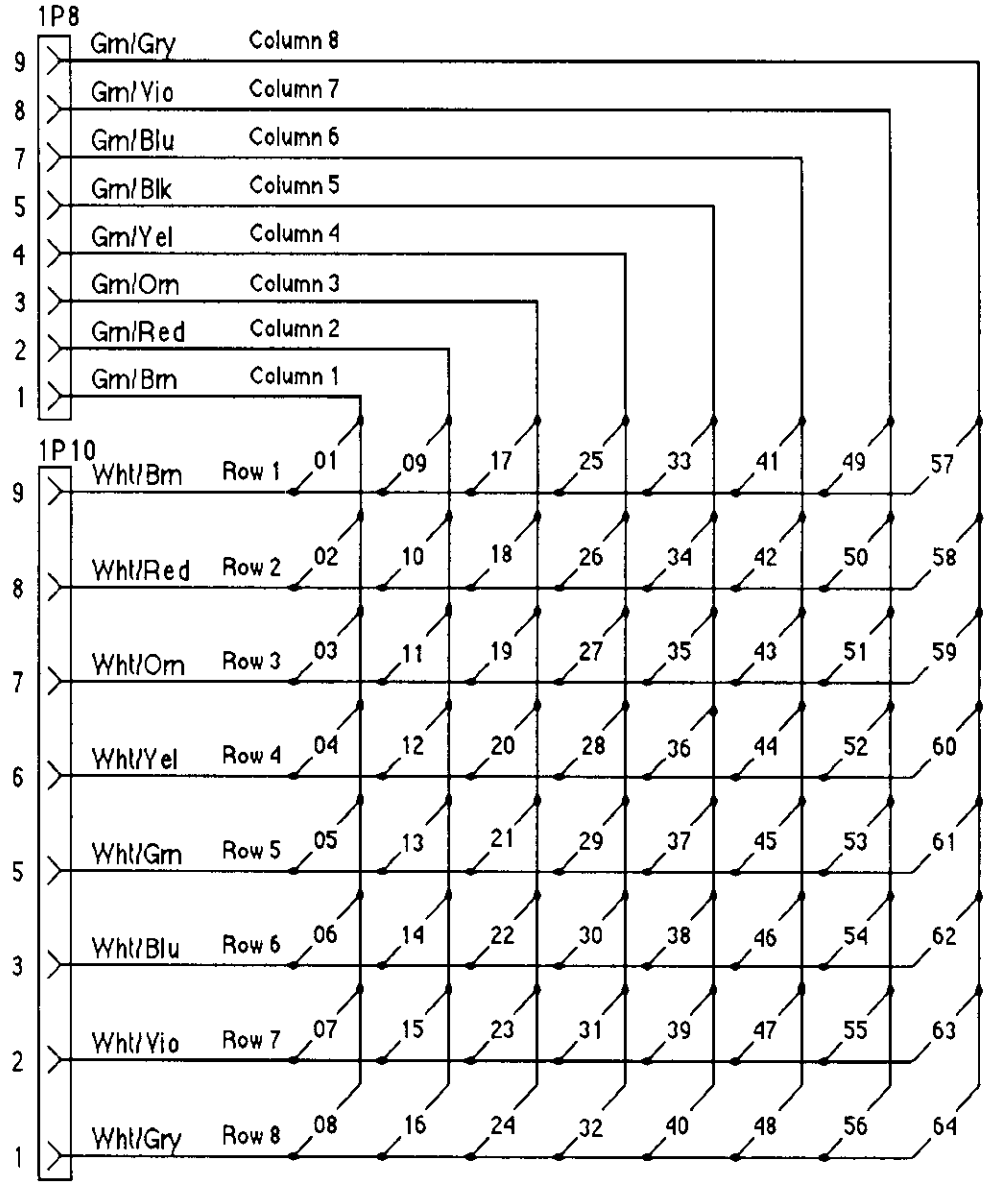
Switches

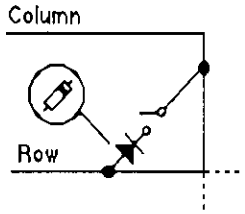
Item	Part No.	Description
1		Plumb Bob Tilt
2	5580-09555-01	C Side Power/A-C Relay
3	SW-1A-126	Credit Button
4	27-1092	R Coin Chute (USA)
5	Not Used (USA)	Center Coin Chute
6	27-1092	L Coin Chute (USA)
7	27-1066	Slam Tilt
8	27-1008	High Score Reset*
9	B-8306-1	Playfield Tilt
10	5647-12133-12	Outhole
11	5647-12073-08	Ball Trough 1 (right)
12	5647-09957-00	Ball Trough 2 (center)
13	5647-09957-00	Ball Trough 3 (left)
14	5647-12073-04	Ball Shooter Lane
15	5647-12073-07	Ramp UP
16	5647-12073-15	Ramp DOWN
17	5647-12073-19	B (of BET)
18	5647-12073-19	E (of BET)
19	5647-12073-19	T (of BET)
20	5647-12073-19	Left Outlane (drain)
21	5647-12073-19	Left Return Lane
22	5647-12073-19	Right Return Lane
23	5647-12073-19	Right Outlane (drain)
24	B-12001-4	Double Score Tgt
25	p/o C-11318-1	BL 3-Bank Dr Tgt (top)
26	p/o C-11318-1	BL 3-Bank Dr Tgt (mdl
27	p/o C-11318-1	BL 3-Bank Dr Tgt (lwr)
28	5647-12073-01	Ace (UPF)
29	5647-12073-01	King (UPF)
30	5647-12073-01	Queen (UPF)
31	5647-12073-01	Jack (UPF)
32	5647-12073-01	10 (UPF)
33	Not Used	
34	Not Used	
35	Not Used	
36	p/o C-11318-1	BR 3-Bank Dr Tgt (top)
37	p/o C-11318-1	BR 3-Bank Dr Tgt (mdl
38	p/o C-11318-1	BR 3-Bank Dr Tgt (lwr)
39	Not Used	
40	Not Used	
41	p/o C-11318-1	TL 3-Bank Dr Tgt (top)
42	p/o C-11318-1	TL 3-Bank Dr Tgt (mdl)
43	p/o C-11318-1	TL 3-Bank Dr Tgt (lwr)
44	5647-12133-01	TL Kicker
45	5647-12133-01	Left Lock 1 Ball
46	5647-12073-19	Left Lock 2 Balls
47	5647-12133-11	TR Eject
48	5647-12133-08	Spinner
49	5647-12073-13	Left Ramp Score
50	5647-12073-13	Right Ramp Score
51	Not Used	
52	B-11854-4	Ramp RAISE
53	B-4834-K	10 pt (TR)



Item	Part No.	Description
54	Not Used	
55	Not Used	
56	B-4834-K	10 pt (BR)
57		R Flipper Lane Change**
58		L Flipper Lane Change**
59	Not Used	
60	B-12030-2	Left Jet Bumper
61	B-12030-2	Right Jet Bumper
62	B-12030-2	Lower Jet Bumper
63		BL Kicker***
64		BR Kicker***
-	SW-10A-48	Flipper Button (Cabinet sides)

Notes: * Part Number is for entire Diagnostic Switch Assembly, including H S Reset Switch;
** Optotransistor on Backbox Interconnect Bd; *** [Paired Kicker Actuating Sw: A-4834-H; B-8734-1]



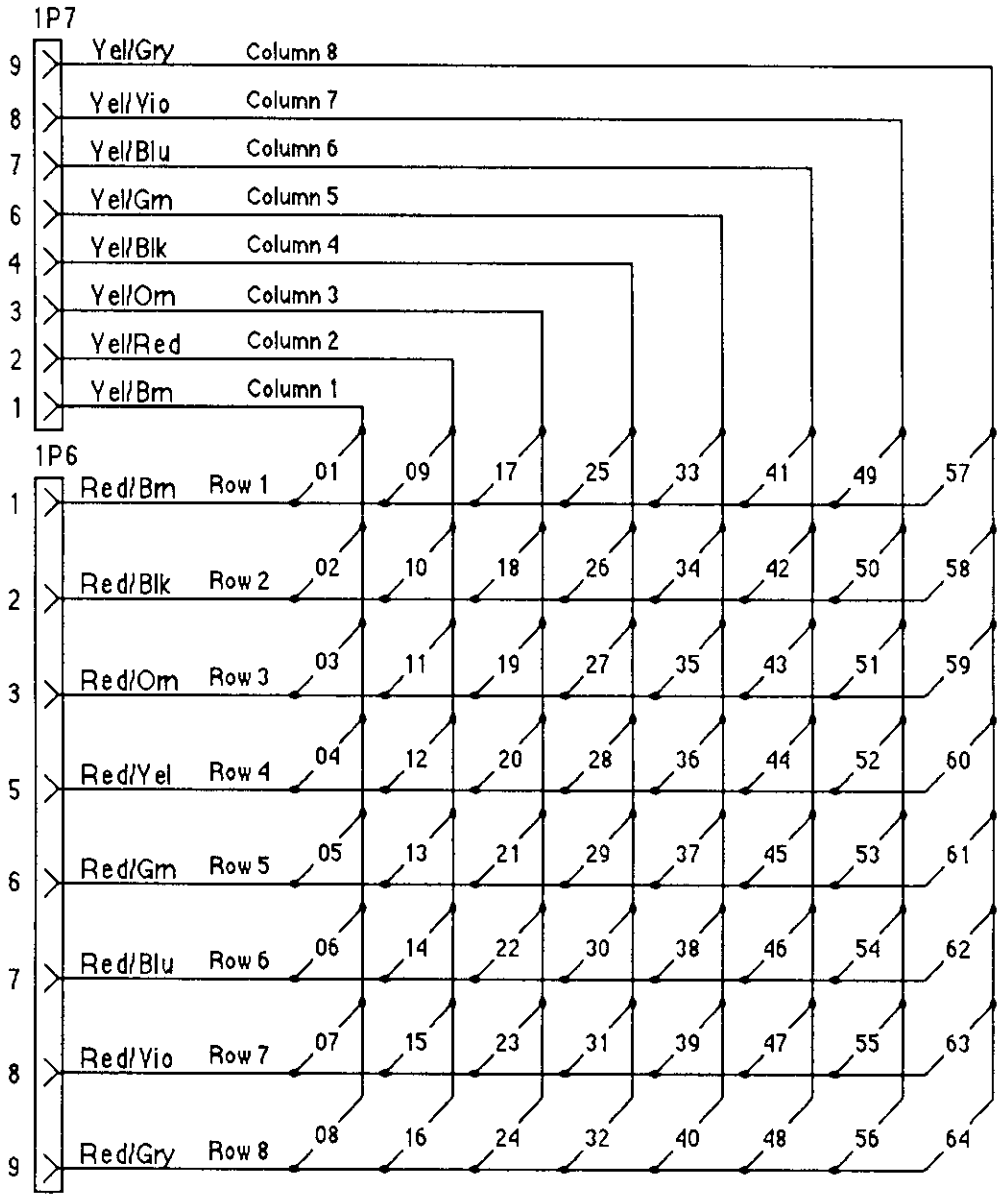


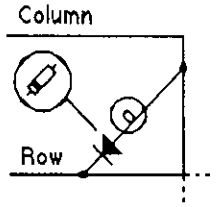
Typical Switch Circuit

JOKERZ Switch-Matrix Table

ROW \ COLUMN	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Playfield Tilt 9	**B** of BET 17	BL 3-Bank DT (top) 25	33	TL 3-Bank DT (top) 41	Left Ramp Score 49	Lane Change Right 57
2 WHT-RED 1J10-8	CSide Power A/C Relay 2	Outhole 10	**E** of BET 18	BL 3-Bank DT (mid) 26	34	TL 3-Bank DT (mid) 42	Right Ramp Score 50	Lane Change Left 58
3 WHT-ORN 1J10-7	Credit Button 3	Ball Trough #1 11	**T** of BET 19	BL 3-Bank DT (bottom) 27	35	TL 3-Bank DT (bottom) 43	51	Draw Poker Home Backglass 59
4 WHT-YEL 1J10-6	Left Coin Chute 4	Ball Trough #2 12	Left Outlane 20	**Ace** UPF 28	BR 3-Bank DT (top) 36	TL Kicker 44	Ramp RAISE 52	Left Jet Bumper 60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Ball Trough #3 13	Left Return Lane 21	**King** UPF 29	BR 3-Bank DT (mid) 37	Left Lock 1 Ball 45	10 pt (TR) 53	Right Jet Bumper 61
6 WHT-BLU 1J10-3	Right Coin Chute 6	Ball Shooter 14	Right Return Lane 22	**Queen** UPF 30	BR 3-Bank DT (bottom) 38	Left Lock 2 Balls 46	54	Lower Jet Bumper 62
7 WHT-VIO 1J10-2	Slam Tilt 7	Ramp UP 15	Right Outlane 23	**Jack** UPF 31	39	TR Eject 47	55	BL Kicker ("sling") 63
8 WHT-GRY 1J10-1	High Score Reset 8	Ramp DOWN 16	Double Score Target 24	**10** UPF 32	40	Spinner 48	10 pt (BR) 56	BR Kicker ("sling") 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield





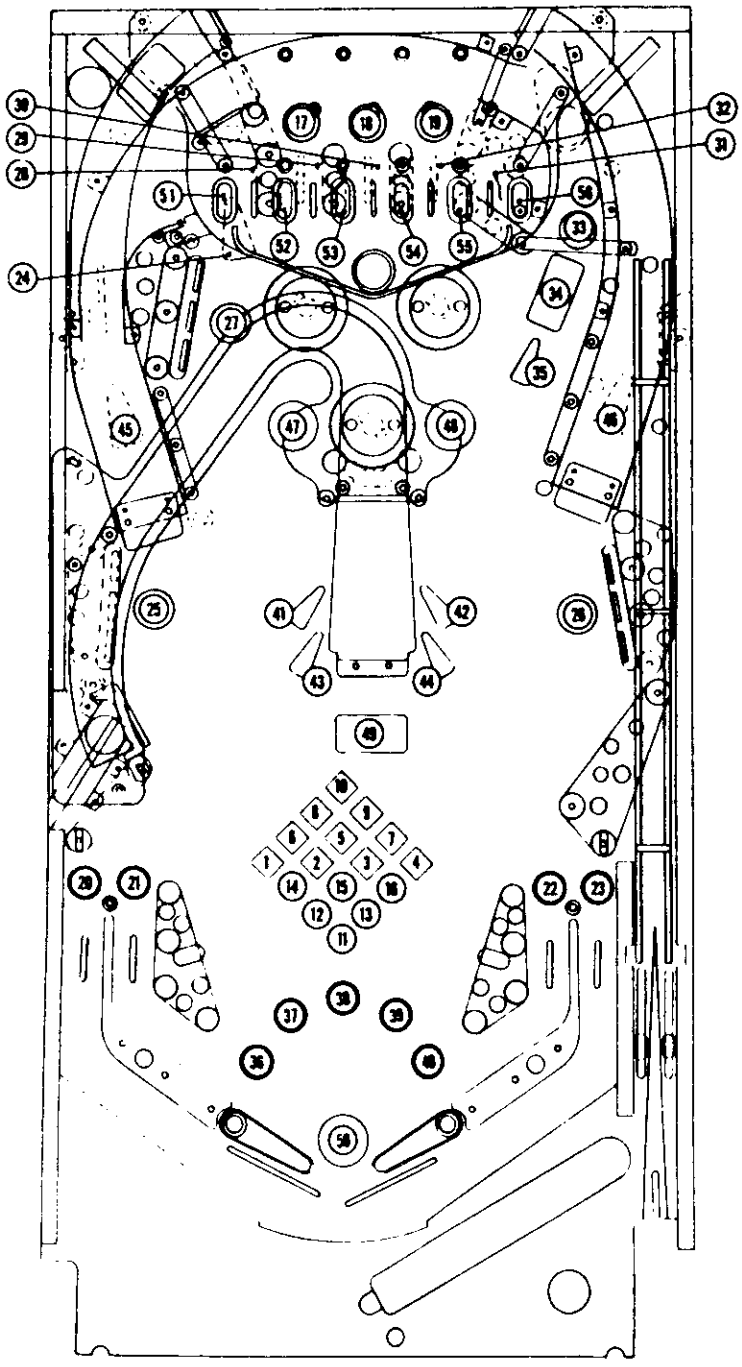
Typical Lamp Circuit

JOKERZ Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
Q60 1 RED-BRN 1J6-1	BONUS (left) 1K 1	BONUS 10K (TR) 9	**B** of BET 17	Drop Target (BL) 25	Spinners 3,000 33	Hearts 41	JACKPOT ** 49	0.5 Million Jackpot (BG) 57
Q61 2 RED-BLK 1J6-2	BONUS 1K 2	BONUS 50K 10	**E** of BET 18	Drop Target (BR) 26	Draw Poker 34	Spades 42	DEAL AGAIN 50	1.0 Million Jackpot (BG) 58
Q62 3 RED-ORN 1J6-3	BONUS 1K 3	2X 11	**T** of BET 19	Drop Target (TL) 27	Special 35	Clubs 43	UPF Illum (left) 51	1.5 Million Jackpot (BG) 59
Q63 4 RED-YEL 1J6-5	BONUS (right) 1K 4	3X 12	Left Outlane 20	**Ace** UPF 28	1 Bell 36	Diamonds 44	UPF Illum 52	2.0 Million Jackpot (BG) 60
Q64 5 RED-GRN 1J6-6	BONUS 5K 5	4X 13	L Return Lane 21	**King** UPF 29	2 Bells 37	Left Ramp 45	UPF Illum 53	2.5 Million Jackpot (BG) 61
Q65 6 RED-BLU 1J6-7	BONUS 10K (BL) 6	5X 14	R Return Lane 22	**Queen** UPF 30	3 Bells 38	Right Ramp 46	UPF Illum 54	3.0 Million Jackpot (BG) 62
Q66 7 RED-VIO 1J6-8	BONUS 10K (BR) 7	6X 15	Right Outlane 23	**Jack** UPF 31	4 Bells 39	Left Jet's 10K 47	UPF Illum 55	3.5 Million Jackpot (BG) 63
Q67 8 RED-GRY 1J6-9	BONUS 10K (TL) 8	7X 16	Double Scores (when Flashing) 24	**10** UPF 32	5 Bells Lites Special 40	Right Jet's 10K 48	UPF Illum (right) 56	4.0 Million Jackpot (BG) 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield BG = Backglass ** = 2 Lamps

Lamps

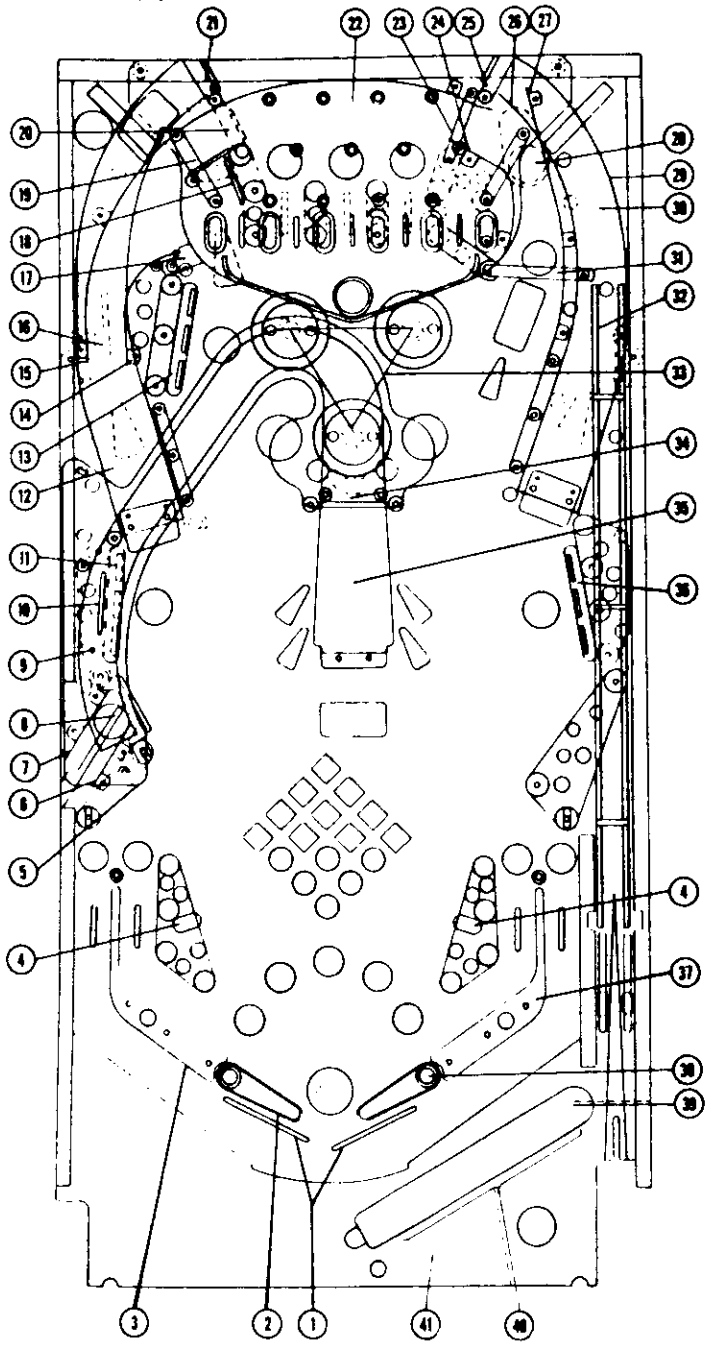


Lamp	Location/Description
1	BONUS (left) 1K
2	BONUS 1K
3	BONUS 1K
4	BONUS (right)1K
5	BONUS 5K
6	BONUS 10K (BL)
7	BONUS 10K (BR)
8	BONUS 10K (TL)
9	BONUS 10K (TR)
10	BONUS 50K
11	2X
12	3X
13	4X
14	5X
15	6X
16	7X
17	B (of BET)
18	E (of BET)
19	T (of BET)
20	L Outlane
21	L Return Lane
22	R Return Lane
23	R Outlane
24	Double Scores w/Flashing
25	Drop Target (BL)
26	Drop Target (BR)
27	Drop Target (TL)
28	Ace (UPF)
29	King (UPF)
30	Queen (UPF)
31	Jack (UPF)
32	Ten (UPF)
33	Spinners 3,000
34	Draw Poker
35	Special
36	1 Bell
37	2 Bells
38	3 Bells
39	4 Bells
40	5 Bells Lites Special
41	Hearts
42	Spades
43	Clubs
44	Diamonds
45	Left Ramp
46	Right Ramp
47	Left Jet's 10K
48	Right Jet's 10K
49	JACKPOT
50	DEAL AGAIN
51	UPF Illum (left)
52	UPF Illum
53	UPF Illum
54	UPF Illum

Lamp	Location/Description
55	UPF Illum
56	UPF Illum (right)
57	0.5 Million Jackpot (BG)
58	1.0 Million Jackpot (BG)
59	1.5 Million Jackpot (BG)
60	2.0 Million Jackpot (BG)
61	2.5 Million Jackpot (BG)
62	3.0 Million Jackpot (BG)
63	3.5 Million Jackpot (BG)
64	4.0 Million Jackpot (BG)

Playfield Parts

Item	Part No.	Description
1	12-6468	Anti-rebound Wire
2	C-11626-L-3	Lwr Left Flipper Assy
a)	20-9250-5	Lg Flipper Paddle & Shaft
3	B-12363-L	Left Flipper Return Frame
4	B-12283	Kicker Arm ("Sling") Assy
a)	B-11203-R-1	Coil & Bracket Assy
5	D-12275	Center Ramp Assembly
6	A-12339	Ball Guide Assembly
7	A-12208	Ball Guide Assembly
8	B-11395-1	BL Lock Kickbig
a)	B-11203-R-1	Coil & Bracket Assy
9	A-12209	Ball Gate Assembly
a)	12-6690	Gate Wire
10	12-6466-8	Wireform, 2"
11	C-11223-1	BL 3-Bank Drop Target
12	D-12297	Left Ramp Assembly
13	C-11223-1	TL 3-Bank Drop Target
14	B-12340	Ball Guide Assembly
15	D-12205	Ball Guide Assembly
16	B-11395-1	TL Kickbig
a)	B-9362-R-1	Coil & Bracket Assy
17	A-12160	Ball Gate Assembly
a)	12-6690	Gate Wire
18	12-6466-6	Wireform, 1-1/2"
19	B-12001-4	Standup Target, Red
20	A-9465-R	Ball Gate Assembly
a)	12-6565	Gate Wire
21	A-9465-R	Ball Gate Assembly
a)	12-6565	Gate Wire
22	R-12279	Upper Mini-Playfield
23	A-9465-L	Ball Gate Assembly
a)	12-6565	Gate Wire
24	B-12207	Ball Guide Assembly
25	A-9465-L	Ball Gate Assembly
a)	12-6565	Gate Wire
26	01-8967	Eject Hole Ball Stop
27	B-12206	Ball Guide Assembly
28	B-9361-R-6	TR Eject Hole
a)	B-9362-R-1	Coil & Bracket Assy
b)	03-7351-1-9	Tr Red Plastic Ball Seat
29	B-12486	Ramp Deflector Assembly
30	D-12276	Right Ramp Assembly
31	B-12451	Spinner Gate Assembly
a)	31-1019-554	Spinner (no decals)
b)	12-6780	Switch Wire
32	12-6806	Shooter Lane Wireform
33	B-9414-2	Jet Bumper Assy (3)
a)	B-9415-1	Bmpr Coil/Bracket Assy
34	B-11854-4	LIFT RAMP Target, Red
35	B-12278	Lifting Ramp
36	C-11223-1	BR 3-Bank Drop Target
37	B-12363-R	Right Flipper Return Frame



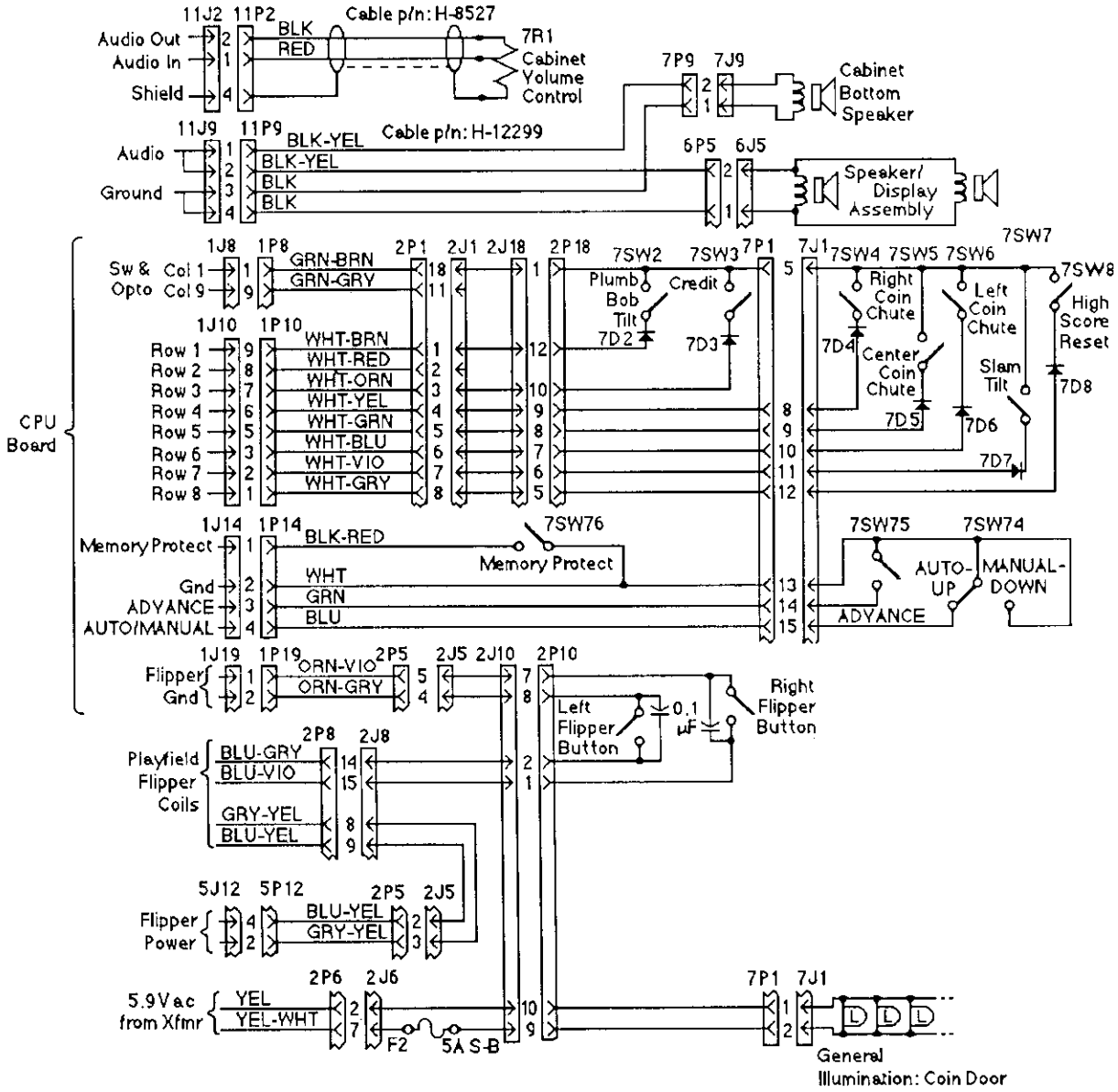
Item	Part No.	Description
38	C-11626-R-3	Lwr Right Flipper Assy
a)	20-9250-5	Flipper Arm on Shaft
39	C-9638-3	Ball Shooter Lane Feeder
		Following parts are located under the Bottom Arch:
40	n/a	Bottom Arch Parts
a)	B-8623	Upr Trough Baffle Assy
b)	C-8235	Lwr Trough Baffle Assy
c)	12-6542	Baffle Wire form
d)	01-3569-1	Ball Trough
e)	01-5575	Bottom Arch Mtg Bracket
41	B-8039-2	Outhole Kicker Assy

Section 3
Reference Diagrams & Schematics

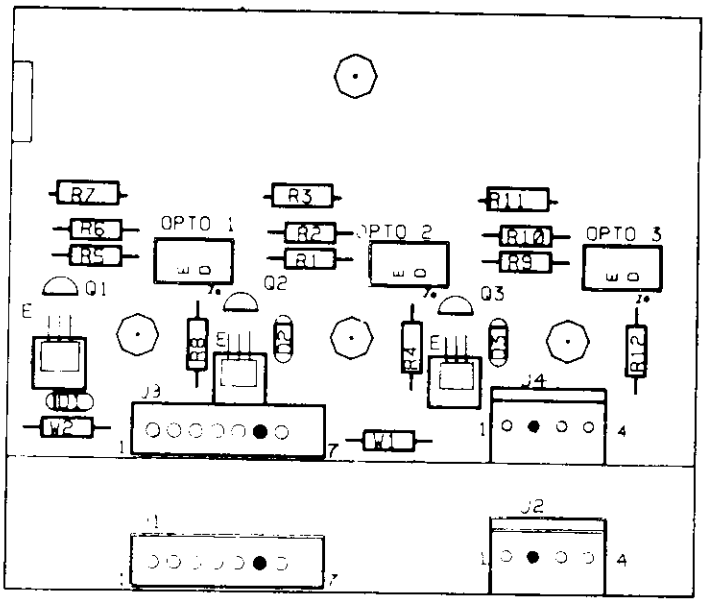
- **Diagrams and Schematics:**

  Cabinet Wiring
  3-Bank Opto Board
  Power Supply Board
  System 11B CPU Board
  Master Display Board
  Audio Board
  Aux Power Driver Board
  Backbox Interconnect Board
  Controlled, Special, & Switched Solenoids
  Power Wiring
  Game Circuit Boards Interboards Signals

- **Diagnostic Test Flowchart**

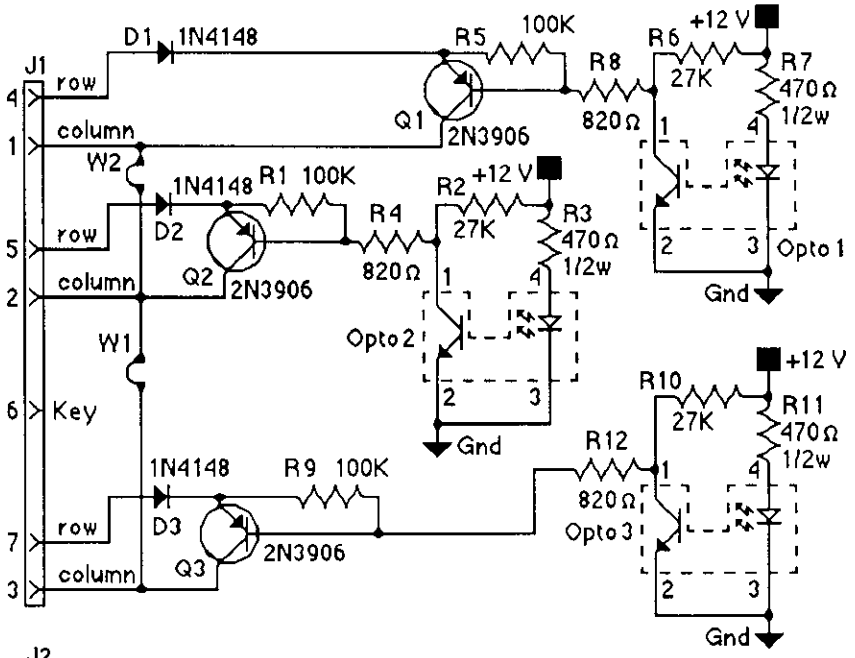


JOKERZ! Cabinet Wiring

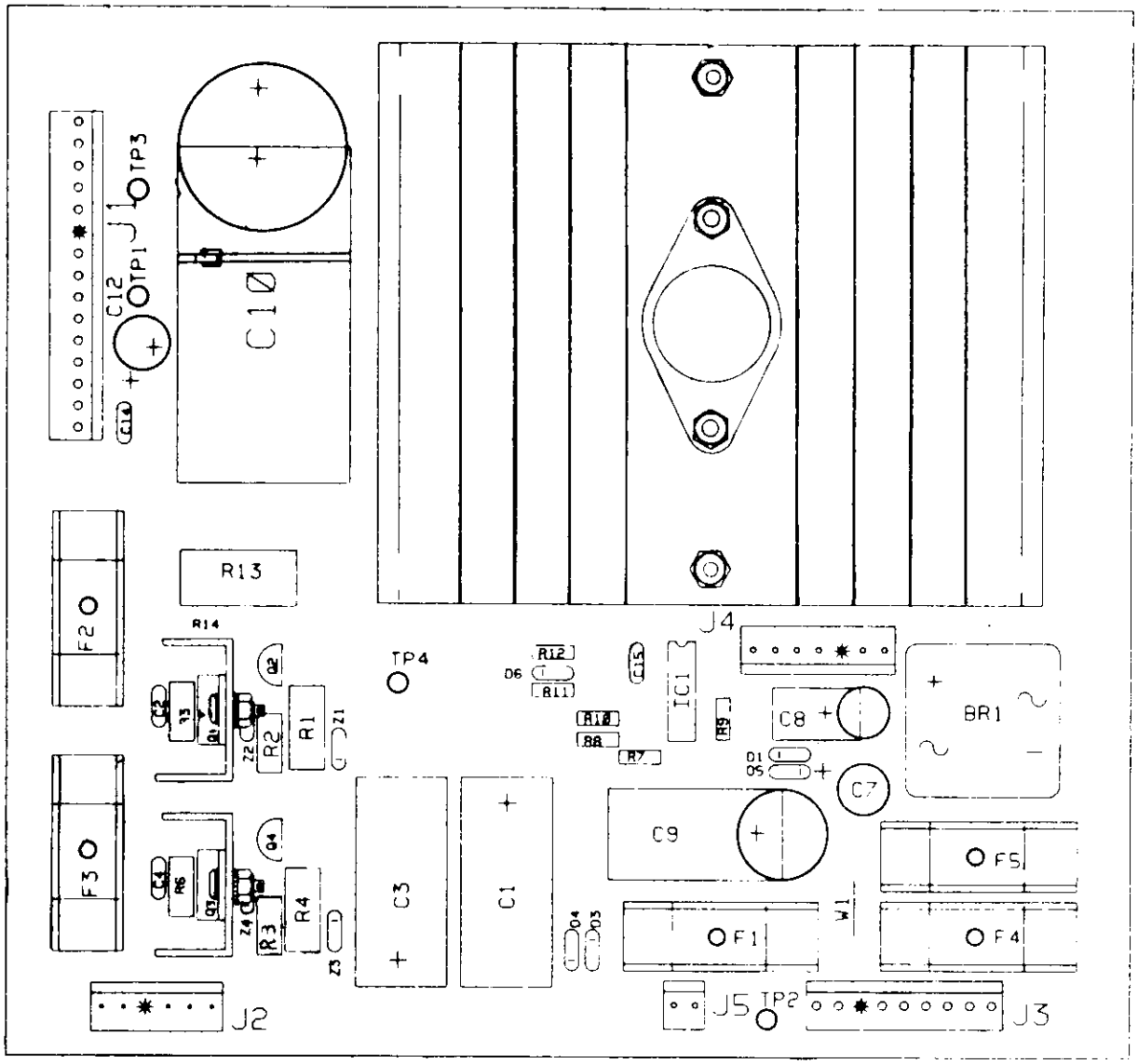


3-Bank Drop Target Opto Board

p/n C-11318-1

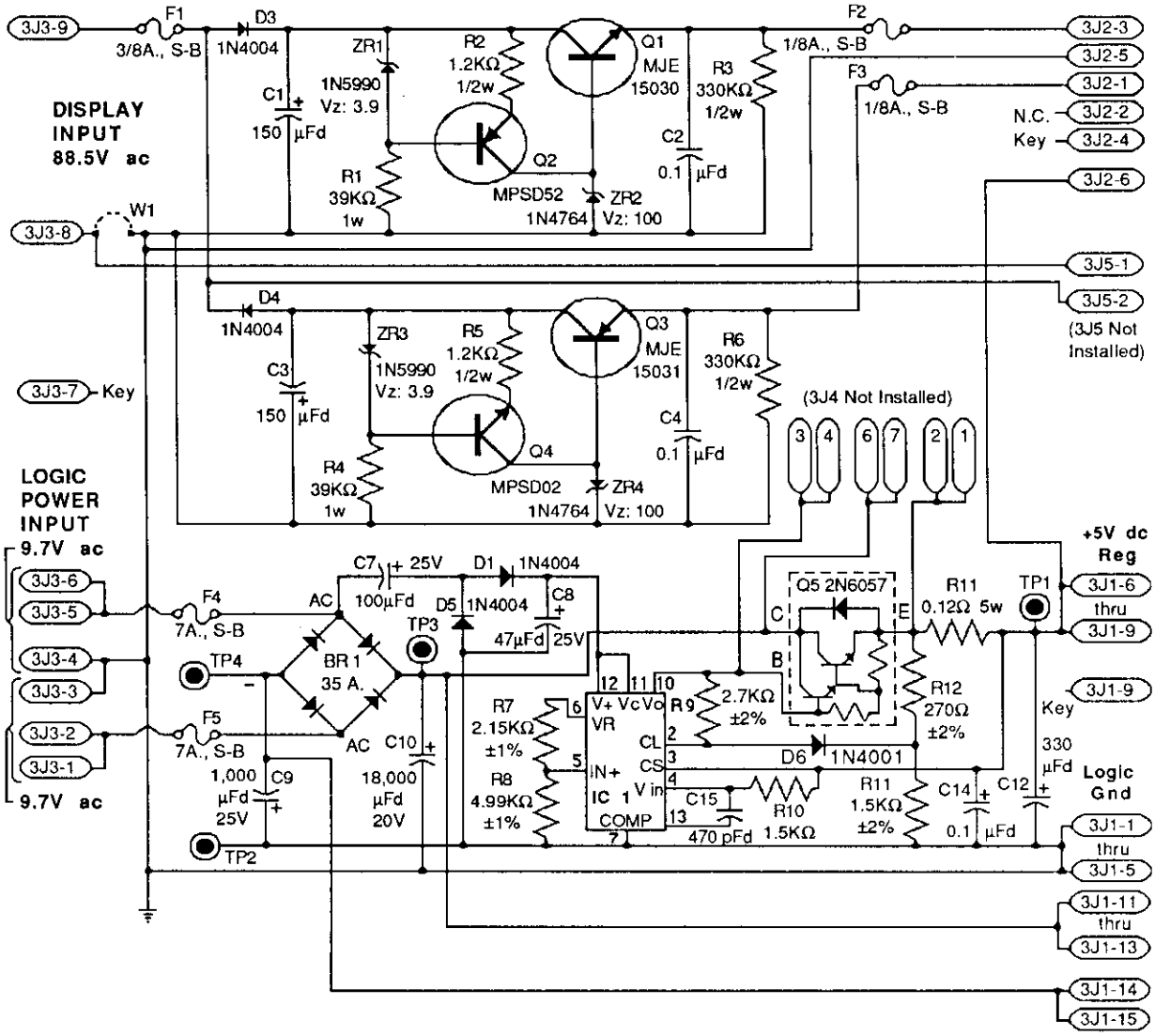


3-Bank Drop Target Opto Board Schematic

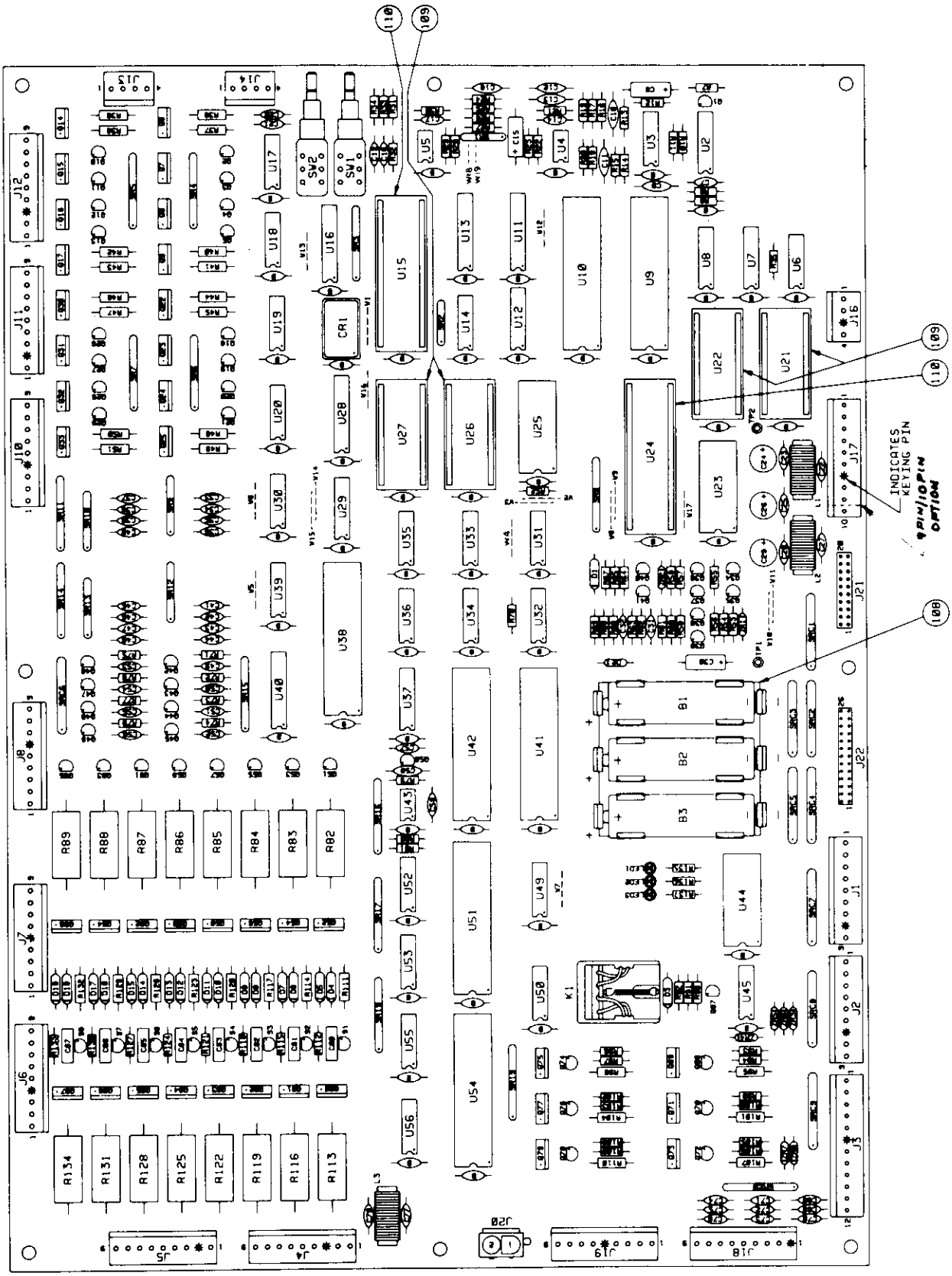


Power Supply Board

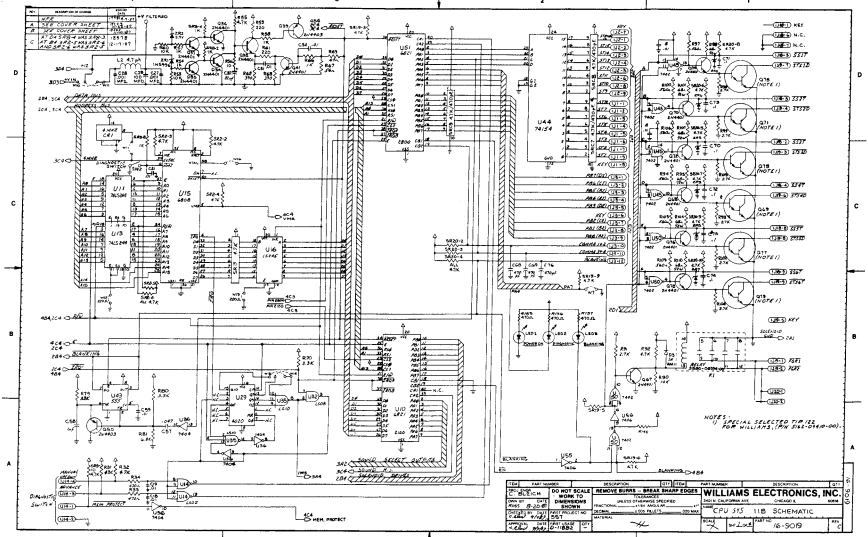
p/n D-12246



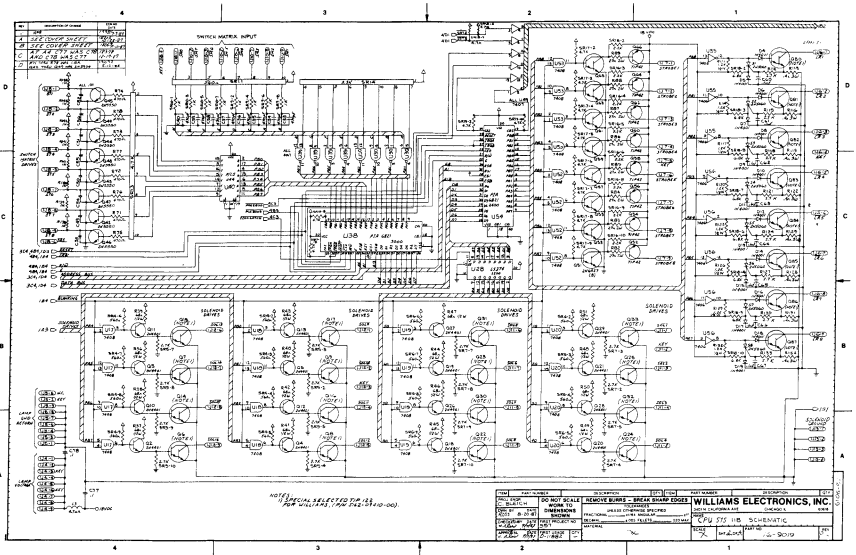
Power Supply Board Schematic



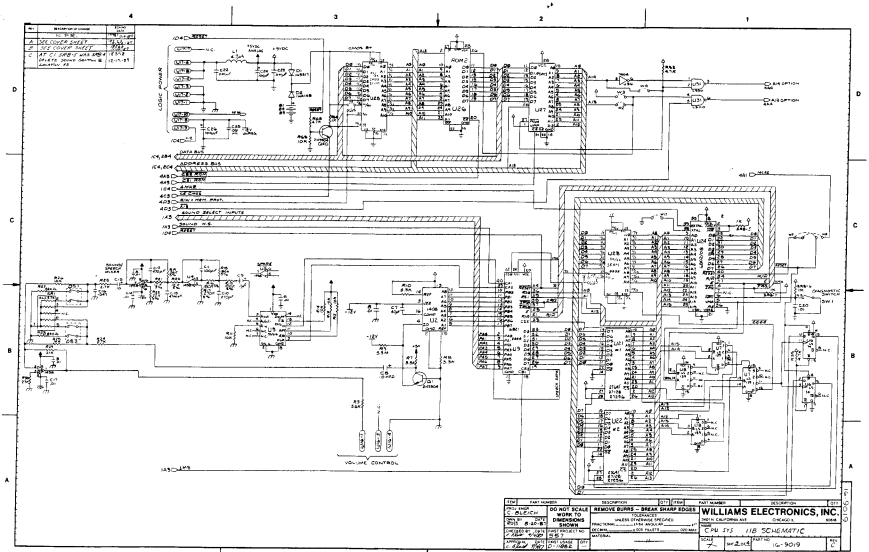
System 11B CPU Board (D-11883)



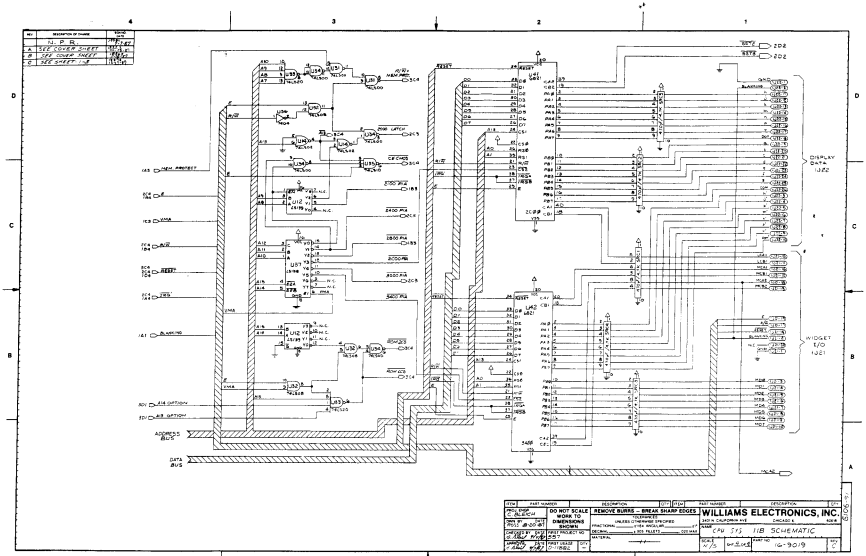
System 11B CPU Schematic (16-9019, Sheet 1 of 4)



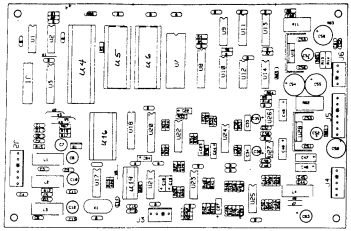
System 11B CPU Schematic (16-9019, Sheet 2 of 4)



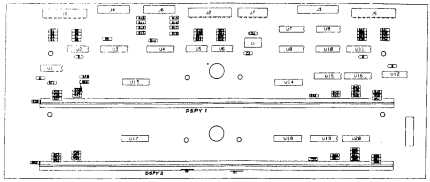
System 11B CPU Schematic (16-9019, Sheet 3 of 4)



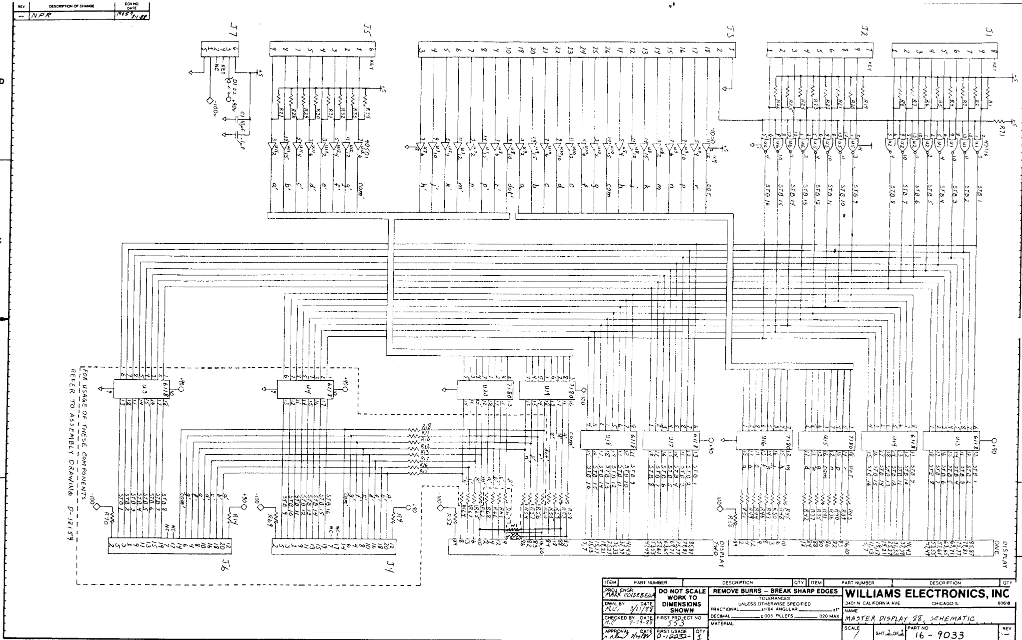
System 11B CPU Schematic (16-9019, Sheet 4 of 4)



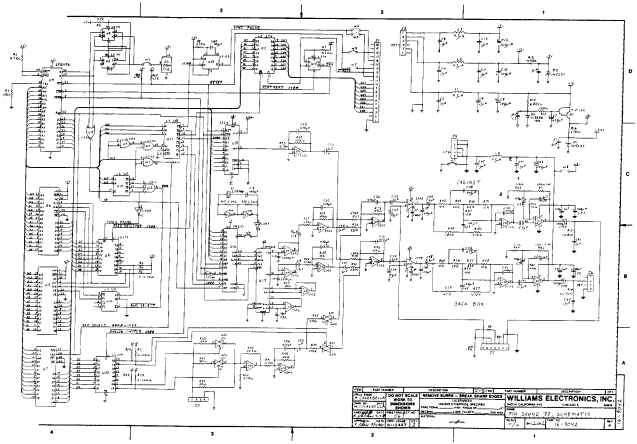
Audio Board
p/n D-12338-567



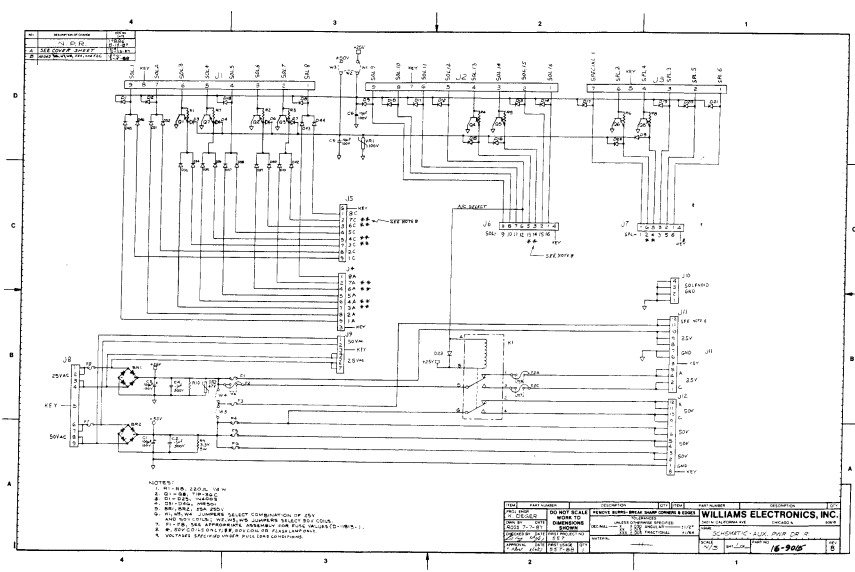
Master Display Board
p/n D-12232-2


WILLIAMS ELECTRONICS, INC
3401 N. CALIFORNIA AVE CHICAGO IL 60618
MASTER DISPLAY 88, SCHEMATIC
PART NO 16 - 9033
SHT 1 OF 1
DO NOT SCALE WORK TO DIMENSIONS SHOWN
REMOVE BURRS – BREAK SHARP EDGES
PROJ ENGR MARK COLDEBELLA
FIRST PROJECT NO. 553
FIRST USAGE D-12232-1
REFER TO ASSEMBLY DRAWING D-12159 FOR USAGE OF THESE COMPONENTS
DISPLAY ONE
DISPLAY TWO

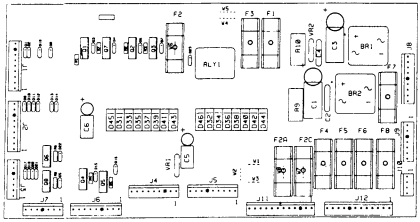
JOKERZ 78



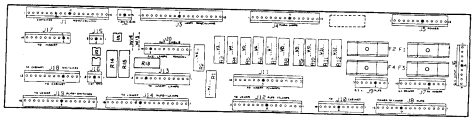
Audio Board (D-12338) Schematic



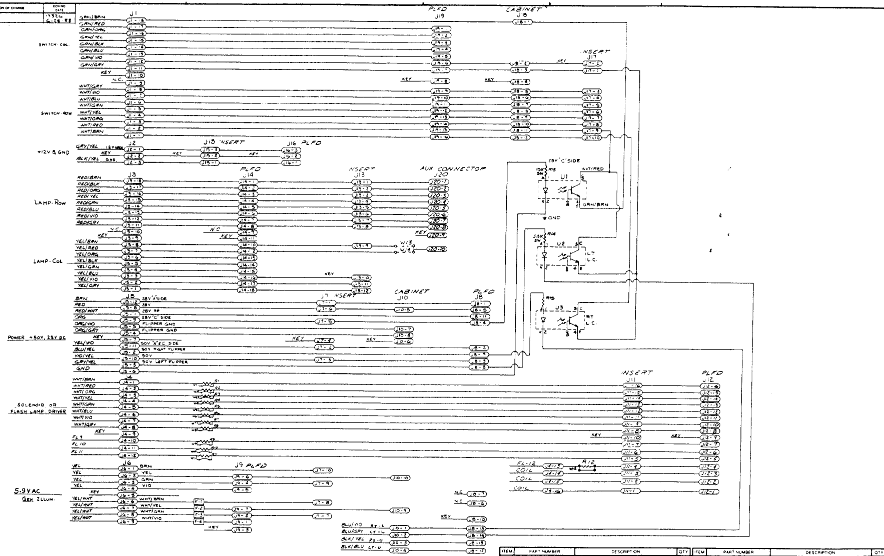
Aux Power Driver Board Schematic



Aux Power Driver Unit Board
p/n D-12247



Backbox Interconnect Board



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY

PROJ ENGR M. JAYSNAL — DO NOT SCALE WORK TO DIMENSIONS SHOWN — REMOVE BURRS-BREAK SHARP CORNERS & EDGES

TOLERANCES UNLESS OTHERWISE SPECIFIED: DECIMAL .X ±.030, .XX ±.015, .XXX ±.005; ANGULAR ±1/2°; FRACTIONAL ±1/64

DWN BY: BM, DATE 6-28-88 — CHECKED BY, DATE 6/23/88 — FIRST PROJECT NO 567 — APPROVAL, DATE 6/30/88 — FIRST USAGE D-12313 — MATERIAL

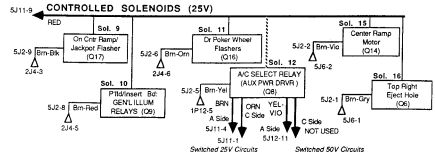
WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE, CHICAGO IL 60618

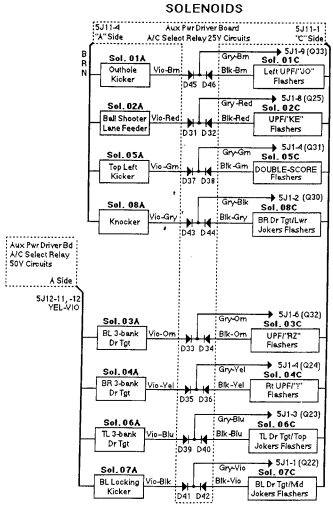
NAME: SCHEMATIC - INTERCONNECT BOARD

SCALE N/S — SHT 1 OF 1 — PART NO 16-9052-1 — REV -

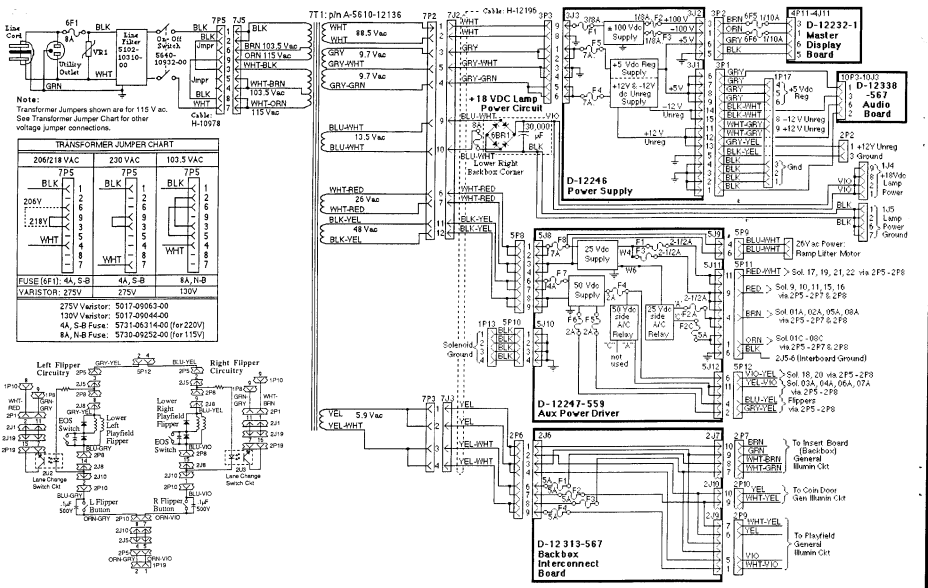
JOKERZ 82

Backbox Interconnect Board (D-12313-567) Schematic





Controlled, Special, and Switched Solenoids



Power Wiring Diagram

INTERCONNECT BOARD INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description
J1/1-1	WHT/BRN	Switch Row 1
J1/1-2	WHT/RED	Switch Row 2
J1/1-3	WHT/ORG	Switch Row 3
J1/1-4	WHT/YEL	Switch Row 4
J1/1-5	WHT/GRN	Switch Row 5
J1/1-6	WHT/BLU	Switch Row 6
J1/1-7	WHT/VIO	Switch Row 7
J1/1-8	WHT/GRY	Switch Row 8
J1/1-9	Key Pin	No Connection
J1/1-10	---	No Connection
J1/1-11	GRN-GRY	Switch Col 8 (CMS)
J1/1-12	GRN-WHT	Switch Col 7 (CMS)
J1/1-13	GRN-BLU	Switch Col 6 (CMS)
J1/1-14	GRN-VIO	Switch Col 5 (CMS)
J1/1-15	GRN-YEL	Switch Col 4 (CMS)
J1/1-16	GRN-ORG	Switch Col 3 (CMS)
J1/1-17	GRN-RED	Switch Col 2 (CMS)
J1/1-18	GRN-BRN	Switch Col 1 (CMS)
J2/4-1	WHT/BRN	Solenoid 01C
J2/4-2	WHT/RED	Solenoid 02C
J2/4-3	WHT/ORG	Solenoid 03C
J2/4-4	WHT/YEL	Solenoid 04C
J2/4-5	WHT/GRN	Solenoid 05C
J2/4-6	WHT/BLU	Solenoid 06C
J2/4-7	WHT/VIO	Solenoid 07C
J2/4-8	WHT/GRY	Solenoid 08C
J2/4-9	Key Pin	No Connection
J2/4-10	BRN/BLK	Solenoid 15
J2/4-11	BRN/ORG	Solenoid 14
J2/4-12	BRN/RED	Solenoid 9
J2/4-13	BRN/VIO	Solenoid 10
J2/4-14	BRN/GRY	Solenoid 11
J2/4-15	---	No Connection
J2/4-16	---	No Connection
J2/6-1	YEL	Transformer: 6V ac
J2/6-2	YEL	Transformer: 6V ac
J2/6-3	YEL	Transformer: 6V ac
J2/6-4	YEL	Transformer: 6V ac
J2/6-5	Key Pin	No Connection
J2/6-6	YEL/WHT	Transformer: 6V ac
J2/6-7	YEL/WHT	Transformer: 6V ac
J2/6-8	YEL/WHT	Transformer: 6V ac
J2/6-9	YEL/WHT	Transformer: 6V ac
J2/8-1	BRN	+25 Vdc / Sol. Power "A"
J2/8-2	YEL/VIO	+25 Vdc / Sol. Power "A"
J2/8-3	VIO/YEL	+50 Vdc / Sol. Power
J2/8-4	ORG	+25 Vdc / Sol. Power "C"
J2/8-5	RED	+25 Vdc / Sol. Power
J2/8-6	---	No Connection
J2/8-7	---	No Connection
J2/8-8	GRY/YEL	+50 Vdc / Flippers
J2/8-9	BLU/YEL	+50 Vdc / Flippers
J2/8-10	Key Pin	No Connection
J2/8-11	RED/WHT	+50 Vdc / Sol. Power
J2/8-12	---	No Connection
J2/8-13	---	No Connection
J2/8-14	BLU/GRY	Lwr L Flipper Switch, LPF
J2/8-15	BLU/VIO	Lwr R Flipper Switch, LPF
J2/10-1	BLU/YEL	Lwr R Flipper Switch, LPF
J2/10-2	BLU/GRY	Lwr L Flipper Switch, LPF
J2/10-3	---	No Connection
J2/10-4	---	No Connection
J2/10-5	RED	+50 Vdc / Flippers
J2/10-6	Key Pin	No Connection
J2/10-7	ORN/VIO	Solenoid 12
J2/10-8	ORN/GRY	Solenoid 13
J2/10-9	WHT/YEL	Gen Illum Power: 6V ac
J2/10-10	YEL	Transformer: 6V ac

Connector	Wire Color	Signal Designation/Description
J1/2-1	---	No Connection
J1/2-2	---	No Connection
J1/2-3	BRN/GRY	Solenoid 16
J1/2-4	BRN/VIO	Solenoid 15
J1/2-5	BRN/RED	Solenoid 14
J1/2-6	---	No Connection
J1/2-7	BRN/BLK	Solenoid 9
J1/2-8	---	No Connection
J1/2-9	Key Pin	No Connection
J1/2-10	BLK/YEL	Solenoid 04C
J1/2-11	BLK/ORG	Solenoid 03C
J1/2-12	BLK/RED	Solenoid 02C
J1/2-13	BLK/BRN	Solenoid 01C
J1/2-14	RED/BRN	Lamp Row 1 (080)
J1/2-15	RED/BLK	Lamp Row 2 (081)
J1/2-16	RED/ORG	Lamp Row 3 (082)
J1/2-17	RED/YEL	Lamp Row 4 (083)
J1/2-18	RED/GRN	Lamp Row 5 (084)
J1/2-19	RED/BLU	Lamp Row 6 (085)
J1/2-20	RED/VIO	Lamp Row 7 (086)
J1/2-21	RED/GRY	Lamp Row 8 (087)
J1/2-22	RED/WHT	Lamp Row 9 (088)
J1/2-23	---	No Connection
J1/2-24	YEL/BRN	Lamp Col 1 (CMS/S56)
J1/2-25	YEL/BLK	Lamp Col 2 (CMS/S57)
J1/2-26	YEL/ORG	Lamp Col 3 (CMS/S58)
J1/2-27	YEL/RED	Lamp Col 4 (CMS/S59)
J1/2-28	YEL/GRN	Lamp Col 5 (CMS/S60)
J1/2-29	YEL/BLU	Lamp Col 6 (CMS/S61)
J1/2-30	YEL/VIO	Lamp Col 7 (CMS/S62)
J1/2-31	YEL/GRY	Lamp Col 8 (CMS/S63)
J1/2-32	---	No Connection
J1/2-33	BLK/YEL	Solenoid 04C
J1/2-34	BLK/ORG	Solenoid 03C
J1/2-35	BLK/RED	Solenoid 02C
J1/2-36	BLK/BRN	Solenoid 01C
J1/3-1	BRN/BLK	Solenoid 9
J1/3-2	BRN/VIO	Solenoid 10
J1/3-3	BRN/GRY	Solenoid 11
J1/3-4	BRN/RED	Solenoid 12
J1/3-5	BRN/ORG	Solenoid 13
J1/3-6	BRN/YEL	Solenoid 14
J1/3-7	BRN/GRN	Solenoid 15
J1/3-8	BRN/BLU	Solenoid 16
J1/3-9	---	No Connection
J1/3-10	---	No Connection
J1/3-11	---	No Connection
J1/3-12	---	No Connection
J1/3-13	---	No Connection
J1/3-14	---	No Connection
J1/3-15	---	No Connection
J1/3-16	---	No Connection
J1/3-17	---	No Connection
J1/3-18	---	No Connection
J1/3-19	---	No Connection
J1/3-20	---	No Connection
J1/3-21	---	No Connection
J1/3-22	---	No Connection
J1/3-23	---	No Connection
J1/3-24	---	No Connection
J1/4-1	BRN/BLK	Solenoid 9
J1/4-2	BRN/VIO	Solenoid 10
J1/4-3	BRN/GRY	Solenoid 11
J1/4-4	BRN/RED	Solenoid 12
J1/4-5	BRN/ORG	Solenoid 13
J1/4-6	BRN/YEL	Solenoid 14
J1/4-7	BRN/GRN	Solenoid 15
J1/4-8	BRN/BLU	Solenoid 16
J1/4-9	---	No Connection
J1/4-10	---	No Connection
J1/4-11	---	No Connection
J1/4-12	---	No Connection
J1/4-13	---	No Connection
J1/4-14	---	No Connection
J1/4-15	---	No Connection
J1/4-16	---	No Connection
J1/4-17	---	No Connection
J1/4-18	---	No Connection

INTERCONNECT BOARD INTERBOARD SIGNALS
(Continued)

Connector	Wire Color	Signal Designation/Description
J1/5-1	RED/BRN	Lamp Row 1 (090)
J1/5-2	RED/BLK	Lamp Row 2 (091)
J1/5-3	RED/ORG	Lamp Row 3 (092)
J1/5-4	RED/YEL	Lamp Row 4 (093)
J1/5-5	RED/GRN	Lamp Row 5 (094)
J1/5-6	RED/BLU	Lamp Row 6 (095)
J1/5-7	RED/VIO	Lamp Row 7 (096)
J1/5-8	RED/GRY	Lamp Row 8 (097)
J1/5-9	---	No Connection
J1/5-10	Key Pin	No Connection
J1/5-11	---	No Connection
J1/5-12	YEL/GRY	Lamp Col 8 (CMS/S52)
J1/5-13	BLK/YEL	Solenoid 04C
J1/5-14	BLK/ORG	Solenoid 03C
J1/5-15	BLK/RED	Solenoid 02C
J1/5-16	BLK/BRN	Solenoid 01C
J1/6-1	BLK/YEL	Logic Ground
J1/6-2	Key Pin	No Connection
J1/6-3	GRY/YEL	CPU: Power: +12 Vdc Unreg
J1/7-1	GRN/GRY	Switch Col 8 (CMS)
J1/7-2	Key Pin	No Connection
J1/7-3	---	No Connection
J1/7-4	---	No Connection
J1/7-5	---	No Connection
J1/7-6	WHT/VIO	Switch Row 7
J1/7-7	WHT/BLU	Switch Row 6
J1/7-8	WHT/GRN	Switch Row 5
J1/7-9	WHT/YEL	Switch Row 4
J1/7-10	WHT/ORG	Switch Row 3
J1/7-11	---	No Connection
J1/7-12	WHT/BRN	Switch Row 1
J1/8-1	GRN/RED	Switch Col 2 (CMS)
J1/8-2	GRN/ORG	Switch Col 3 (CMS)
J1/8-3	GRN/YEL	Switch Col 4 (CMS)
J1/8-4	GRN/BLK	Switch Col 5 (CMS)
J1/8-5	GRN/BLU	Switch Col 6 (CMS)
J1/8-6	GRN/VIO	Switch Col 7 (CMS)
J1/8-7	GRN/GRY	Switch Col 8 (CMS)
J1/8-8	Key Pin	No Connection
J1/8-9	WHT/GRY	Switch Row 8
J1/8-10	WHT/VIO	Switch Row 7
J1/8-11	WHT/BLU	Switch Row 6
J1/8-12	WHT/GRN	Switch Row 5
J1/8-13	WHT/YEL	Switch Row 4
J1/8-14	WHT/ORG	Switch Row 3
J1/8-15	WHT/RED	Switch Row 2
J1/8-16	WHT/BRN	Switch Row 1

Connector	Wire Color	Signal Designation/Description
J1/9-1	GRN/BLK	Switch Col 5 (CMS)
J1/9-2	RED/BLK	Lamp Row 2 (081)
J1/9-3	RED/ORG	Lamp Row 3 (082)
J1/9-4	RED/YEL	Lamp Row 4 (083)
J1/9-5	RED/GRN	Lamp Row 5 (084)
J1/9-6	RED/BLU	Lamp Row 6 (085)
J1/9-7	RED/VIO	Lamp Row 7 (086)
J1/9-8	RED/GRY	Lamp Row 8 (087)
J1/9-9	---	No Connection
J1/9-10	Key Pin	No Connection
J1/9-11	---	No Connection
J1/9-12	YEL/GRY	Lamp Col 8 (CMS/S52)
J1/9-13	BLK/YEL	Solenoid 04C
J1/9-14	BLK/ORG	Solenoid 03C
J1/9-15	BLK/RED	Solenoid 02C
J1/9-16	BLK/BRN	Solenoid 01C
J1/10-1	BLK/YEL	Logic Ground
J1/10-2	Key Pin	No Connection
J1/10-3	GRY/YEL	CPU: Power: +12 Vdc Unreg
J2/1-1	GRN/GRY	Switch Col 8 (CMS)
J2/1-2	Key Pin	No Connection
J2/1-3	---	No Connection
J2/1-4	---	No Connection
J2/1-5	Key Pin	No Connection
J2/1-6	WHT/VIO	Switch Row 7
J2/1-7	---	No Connection
J2/1-8	---	No Connection
J2/1-9	---	No Connection
J2/1-10	WHT/GRN	Switch Row 5
J2/1-11	WHT/YEL	Switch Row 4
J2/1-12	WHT/ORG	Switch Row 3
J2/1-13	WHT/RED	Switch Row 2
J2/1-14	WHT/BRN	Switch Row 1
J2/2-1	---	No Connection
J2/2-2	Key Pin	No Connection
J2/2-3	BRN/GRY	Solenoid 16
J2/2-4	BRN/VIO	Solenoid 15
J2/2-5	BRN/RED	Solenoid 14
J2/2-6	---	No Connection
J2/2-7	BRN/BLK	Solenoid 9
J2/2-8	---	No Connection
J2/2-9	Key Pin	No Connection
J2/2-10	BLK/YEL	Solenoid 04C
J2/2-11	BLK/ORG	Solenoid 03C
J2/2-12	BLK/RED	Solenoid 02C
J2/2-13	BLK/BRN	Solenoid 01C
J2/3-1	---	No Connection
J2/3-2	---	No Connection
J2/3-3	RED/BRN	Lamp Row 1 (080)
J2/3-4	RED/BLK	Lamp Row 2 (081)
J2/3-5	RED/ORG	Lamp Row 3 (082)
J2/3-6	RED/YEL	Lamp Row 4 (083)
J2/3-7	RED/GRN	Lamp Row 5 (084)
J2/3-8	RED/BLU	Lamp Row 6 (085)
J2/3-9	RED/VIO	Lamp Row 7 (086)
J2/3-10	RED/GRY	Lamp Row 8 (087)
J2/3-11	---	No Connection
J2/3-12	YEL/BRN	Lamp Col 1 (CMS/S56)
J2/3-13	YEL/BLK	Lamp Col 2 (CMS/S57)
J2/3-14	YEL/ORG	Lamp Col 3 (CMS/S58)
J2/3-15	YEL/RED	Lamp Col 4 (CMS/S59)
J2/3-16	YEL/GRN	Lamp Col 5 (CMS/S60)
J2/3-17	YEL/BLU	Lamp Col 6 (CMS/S61)
J2/3-18	YEL/VIO	Lamp Col 7 (CMS/S62)
J2/3-19	YEL/GRY	Lamp Col 8 (CMS/S63)
J2/3-20	---	No Connection
J2/3-21	---	No Connection
J2/3-22	---	No Connection
J2/3-23	---	No Connection
J2/3-24	---	No Connection

AUX POWER DRIVER INTERBOARD SIGNALS

Connector	Wire Color	Signal Designation/Description
J3/1-1	GRY/BLK	CPU: Solenoid 8 (Q22) / IJ11-9
J3/1-2	GRY/VIO	CPU: Solenoid 15 (Q27) / IJ11-8
J3/1-3	GRY/BLU	CPU: Solenoid 6 (Q25) / IJ11-7
J3/1-4	GRY/GRN	CPU: Solenoid 5 (Q31) / IJ11-6
J3/1-5	GRY/YEL	CPU: Solenoid 4 (Q24) / IJ11-5
J3/1-6	GRY/ORG	CPU: Solenoid 3 (Q32) / IJ11-4
J3/1-7	GRY/RED	CPU: Solenoid 2 (Q35) / IJ11-3
J3/1-8	Key Pin	No Connection
J3/1-9	GRY/BRN	CPU: Solenoid 1 (Q33) / IJ11-1
J3/2-1	BLU/BLK	CPU: Spl Solenoid 6 (Q79) / IJ19-9
J3/2-2	BLU/GRY	CPU: Spl Solenoid 5 (Q77) / IJ19-8
J3/2-3	BLU/VIO	CPU: Spl Solenoid 3 (Q73) / IJ19-3
J3/2-4	BLU/YEL	CPU: Spl Solenoid 4 (Q69) / IJ19-6
J3/2-5	Key Pin	No Connection
J3/2-6	BLU/RED	CPU: Spl Solenoid 2 (Q71) / IJ19-4
J3/2-7	BLU/BRN	CPU: Spl Solenoid 1 (Q75) / IJ19-7
J3/5-1	WHT/GRY	Solenoid 08C
J3/5-2	WHT/VIO	Solenoid 07C
J3/5-3	WHT/BLU	Solenoid 06C
J3/5-4	WHT/GRN	Solenoid 05C
J3/5-5	WHT/YEL	Solenoid 04C
J3/5-6	Key Pin	No Connection
J3/5-7	WHT/ORG	Solenoid 03C
J3/5-8	WHT/RED	Solenoid 02C
J3/5-9	WHT/BRN	Solenoid 01C
J3/7-1	BLU/BLK	Spl Solenoid 6
J3/7-2	BLU/GRN	Spl Solenoid 5
J3/7-3	BLU/ORN	Spl Solenoid 4
J3/7-4	Key Pin	No Connection
J3/7-5	BLU/YEL	Spl Solenoid 3
J3/7-6	BLU/RED	Spl Solenoid 2
J3/7-7	BLU/BRN	Spl Solenoid 1
J3/8-1	---	No Connection
J3/8-2	Key Pin	No Connection
J3/8-3	WHT/VIO	Switch Row 7
J3/8-4	WHT/BLU	Switch Row 6
J3/8-5	WHT/GRN	Switch Row 5
J3/8-6	WHT/YEL	Switch Row 4
J3/8-7	---	No Connection
J3/10-1	BLK	Solenoid Gnd / IJ13-1
J3/10-2	BLK	Solenoid Gnd / IJ13-2
J3/10-3	BLK	Solenoid Gnd / IJ13-3
J3/10-4	BLK	Solenoid Gnd / IJ13-4
J3/12-1	GRY/YEL	+50 Vdc / Flippers
J3/12-2	---	No Connection
J3/12-4	BLU/YEL	+50 Vdc / Flippers
J3/12-5	---	No Connection
J3/12-6	VIO/YEL	+50 Vdc / Sol. 11 & 20
J3/12-7	---	No Connection
J3/12-8	Key Pin	No Connection
J3/12-9	---	No Connection
J3/12-10	---	No Connection
J3/13-11	YEL/VIO	+50 Vdc (4 solnd) / Sol. 03A, 04A, & 05A
J3/12-12	---	No Connection

Connector	Wire Color	Signal Designation/Description
J3/1-1	BRN/GRY	CPU: Solenoid 16 (Q30) / IJ12-9
J3/1-2	BRN/VIO	CPU: Solenoid 15 (Q14) / IJ12-8
J3/1-3	---	No Connection
J3/1-4	---	No Connection
J3/1-5	BRN/YEL	CPU: Solenoid 12 (Q15) / IJ12-5
J3/1-6	BRN/ORG	CPU: Solenoid 11 (Q16) / IJ12-4
J3/1-7	BRN/RED	Key Pin
J3/1-8	BRN/RED	CPU: Solenoid 10 (Q9) / IJ12-2
J3/1-9	GRY/BRN	CPU: Solenoid 9 (Q17) / IJ12-1
J3/4-1	VIO/GRY	Solenoid 08A
J3/4-2	VIO/BLU	Solenoid 07A
J3/4-3	VIO/GRN	Solenoid 06A
J3/4-4	VIO/BLU	Solenoid 05A
J3/4-5	VIO/GRN	Solenoid 04A
J3/4-6	VIO/YEL	Solenoid 03A
J3/4-7	VIO/RED	Solenoid 02A
J3/4-8	VIO/BRN	Solenoid 01A
J3/6-1	BRN/GRY	Solenoid 16
J3/6-2	BRN/VIO	Solenoid 15
J3/6-3	BRN/BLU	Solenoid 14
J3/6-4	Key Pin	No Connection
J3/6-5	---	Solenoid 13
J3/6-6	---	Solenoid 12
J3/6-7	BRN/ORN	Solenoid 11
J3/6-8	BRN/RED	Solenoid 10
J3/6-9	BRN/BLK	Solenoid 9
J3/8-1	WHT/RED	Transformer: 25V ac / 7.2.6
J3/8-2	WHT/RED	Transformer: 25V ac / 7.2.6
J3/8-3	WHT/RED	Transformer: 25V ac / 7.2.7
J3/8-4	WHT/RED	Transformer: 25V ac / 7.2.7
J3/8-5	Key Pin	No Connection
J3/8-6	BLK/YEL	Transformer: 48V ac / 7.2.11
J3/8-7	BLK/YEL	Transformer: 48V ac / 7.2.11
J3/8-8	BLK/YEL	Transformer: 48V ac / 7.2.12
J3/8-9	BLK/YEL	Transformer: 48V ac / 7.2.12
J3/9-1	BLK	Solnd Gnd / IJ13-1
J3/10-2	BLK	Solnd Gnd / IJ13-2
J3/10-3	BLK	Solnd Gnd / IJ13-3
J3/10-4	BLK	Solnd Gnd / IJ13-4
J3/11-1	BLK	Solnd Gnd / IJ13-1
J3/12-2	GRY/YEL	+50 Vdc / Flippers
J3/12-3	---	No Connection
J3/12-4	BLU/YEL	+50 Vdc / Flippers
J3/12-5	---	No Connection
J3/12-6	VIO/YEL	+50 Vdc / Sol. 11 & 20
J3/12-7	---	No Connection
J3/12-8	Key Pin	No Connection
J3/12-9	---	No Connection
J3/12-10	---	No Connection
J3/13-11	YEL/VIO	+50 Vdc (4 solnd) / Sol. 03A, 04A, & 05A
J3/12-12	---	No Connection

Connector	Wire Color	Signal Designation/Description
J4/1-1	BRN/GRY	CPU: Solenoid 16 (Q30) / IJ12-9
J4/1-2	BRN/VIO	CPU: Solenoid 15 (Q14) / IJ12-8
J4/1-3	---	No Connection
J4/1-4	---	No Connection
J4/1-5	BRN/YEL	CPU: Solenoid 12 (Q15) / IJ12-5
J4/1-6	BRN/ORG	CPU: Solenoid 11 (Q16) / IJ12-4
J4/1-7	BRN/RED	Key Pin
J4/1-8	BRN/RED	CPU: Solenoid 10 (Q9) / IJ12-2
J4/1-9	GRY/BRN	CPU: Solenoid 9 (Q17) / IJ12-1
J4/3-1	BLU/BLK	CPU: Spl Solnd 6 (Q79) / IJ19-9
J4/3-2	BLU/GRY	CPU: Spl Solnd 5 (Q77) / IJ19-8
J4/3-3	BLU/VIO	CPU: Spl Solnd 3 (Q73) / IJ19-3
J4/3-4	BLU/YEL	CPU: Spl Solnd 4 (Q69) / IJ19-6
J4/3-5	Key Pin	No Connection
J4/3-6	BLU/RED	CPU: Spl Solnd 2 (Q71) / IJ19-4
J4/3-7	BLU/BRN	CPU: Spl Solnd 1 (Q75) / IJ19-7
J4/5-1	WHT/GRY	Solenoid 08C
J4/5-2	WHT/VIO	Solenoid 07C
J4/5-3	WHT/BLU	Solenoid 06C
J4/5-4	WHT/GRN	Solenoid 05C
J4/5-5	WHT/YEL	Solenoid 04C
J4/5-6	Key Pin	No Connection
J4/5-7	WHT/ORG	Solenoid 03C
J4/5-8	WHT/RED	Solenoid 02C
J4/5-9	WHT/BRN	Solenoid 01C
J4/7-1	BLU/BLK	Spl Solnd 6
J4/7-2	BLU/GRN	Spl Solnd 5
J4/7-3	BLU/ORN	Spl Solnd 4
J4/7-4	Key Pin	No Connection
J4/7-5	BLU/YEL	Spl Solnd 3
J4/7-6	BLU/RED	Spl Solnd 2
J4/7-7	BLU/BRN	Spl Solnd 1
J4/8-1	---	No Connection
J4/8-2	Key Pin	No Connection
J4/8-3	WHT/VIO	Switch Row 7
J4/8-4	WHT/BLU	Switch Row 6
J4/8-5	WHT/GRN	Switch Row 5
J4/8-6	WHT/YEL	Switch Row 4
J4/8-7	---	No Connection
J4/10-1	BLK	Solnd Gnd / IJ13-1
J4/10-2	BLK	Solnd Gnd / IJ13-2
J4/10-3	BLK	Solnd Gnd / IJ13-3
J4/10-4	BLK	Solnd Gnd / IJ13-4
J4/11-1	BLK	Solnd Gnd / IJ13-1
J4/12-2	GRY/YEL	+50 Vdc / Flippers
J4/12-3	---	No Connection
J4/12-4	BLU/YEL	+50 Vdc / Flippers
J4/12-5	---	No Connection
J4/12-6	VIO/YEL	+50 Vdc / Sol. 11 & 20
J4/12-7	---	No Connection
J4/12-8	Key Pin	No Connection
J4/12-9	---	No Connection
J4/12-10	---	No Connection
J4/13-11	YEL/VIO	+50 Vdc (4 solnd) / Sol. 03A, 04A, & 05A
J4/12-12	---	No Connection

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 / 4J4-1
1J1-2	BRN-VIO	ST-7: Display Digit Strobe / 4J3-2	1J2-2	VIO-BLK	ST-15: Display Digit Strobe / 4J4-2
1J1-3	BRN-BLU	ST-6: Display Digit Strobe / 4J3-3	1J2-3	VIO-BLU	ST-14: Display Digit Strobe / 4J4-3
1J1-4	BRN-GRN	ST-5: Display Digit Strobe / 4J3-4	1J2-4	VIO-GRN	ST-13: Display Digit Strobe / 4J4-4
1J1-5	BRN-YEL	ST-4: Display Digit Strobe / 4J3-5	1J2-5	VIO-YEL	ST-12: Display Digit Strobe / 4J4-5
1J1-6	BRN-ORG	ST-3: Display Digit Strobe / 4J3-6	1J2-6	VIO-ORG	ST-11: Display Digit Strobe / 4J4-6
1J1-7	BRN-RED	ST-2: Display Digit Strobe / 4J3-7	1J2-7	Key Pin	No Connection
1J1-8	Key Pin	No Connection	1J2-8	VIO-RED	ST-10: Digit Display Strobe / 4J4-8
1J1-9	BRN-BLK	ST-1: Display Digit Strobe / 4J3-9	1J2-9	VIO-BRN	ST-9: Display Digit Strobe / 4J4-9
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	1J5-1	RED-BRN	Lamp Row 1 (G80)
1J3-12	--	No Connection	1J5-2	RED-BLK	Lamp Row 2 (G81)
			1J5-3	RED-ORG	Lamp Row 3 (G82)
1J5-1	--	No Connection	1J5-4	Key Pin	No Connection
1J5-2	Key Pin	No Connection	1J5-5	RED-YEL	Lamp Row 4 (G83)
1J5-3	BLK	Ground (Lamp Ctrl)	1J5-6	RED-GRN	Lamp Row 5 (G84)
1J5-4	BLK	Ground (Lamp Ctrl)	1J5-7	RED-BLU	Lamp Row 6 (G85)
1J5-5	--	No Connection	1J5-8	RED-VIO	Lamp Row 7 (G86)
1J5-6	--	No Connection	1J5-9	RED-GRY	Lamp Row 8 (G87)
1J5-7	--	No Connection			
1J5-8	BLK	Ground (Lamp Ctrl)	1J6-1	GRN-BRN	Switch Col 1 (1D43)
1J5-9	BLK	Ground (Lamp Ctrl)	1J5-2	GRN-RED	Switch Col 2 (1D49)
			1J5-3	GRN-ORG	Switch Col 3 (1D44)
1J7-1	YEL-BRN	Lamp Col 1 (Q65/66)	1J5-4	GRN-YEL	Switch Col 4 (1D48)
1J7-2	YEL-RED	Lamp Col 2 (Q63/64)	1J5-5	GRN-BLK	Switch Col 5 (1D43)
1J7-3	YEL-ORG	Lamp Col 3 (Q61/62)	1J5-6	Key Pin	No Connection
1J7-4	YEL-BLK	Lamp Col 4 (Q59/60)	1J5-7	GRN-BLU	Switch Col 6 (1D47)
1J7-5	Key Pin	No Connection	1J5-8	GRN-VIO	Switch Col 7 (1D42)
1J7-6	YEL-GRN	Lamp Col 5 (Q57/58)	1J5-9	GRN-GRY	Switch Col 8 (1D46)
1J7-7	YEL-BLU	Lamp Col 6 (Q55/56)			
1J7-8	YEL-VIO	Lamp Col 7 (Q53/54)	1J9	Not Applicable	
1J7-9	YEL-GRY	Lamp Col 8 (Q51/52)			
			1J11-1	GRY-BRN	Solenoid 1 (1D33) / 5J1-9
1J10-1	WHT-GRY	Switch Row 8	1J11-2	Key Pin	No Connection
1J10-2	WHT-VIO	Switch Row 7	1J11-3	GRY-RED	Solenoid 2 (1D35) / 5J1-7
1J10-3	WHT-BLU	Switch Row 6	1J11-4	GRY-ORG	Solenoid 3 (1D32) / 5J1-6
1J10-4	Key Pin	No Connection	1J11-5	GRY-YEL	Solenoid 4 (1D34) / 5J1-5
1J10-5	WHT-GRN	Switch Row 5	1J11-6	GRY-GRN	Solenoid 5 (1D31) / 5J1-4
1J10-6	WHT-YEL	Switch Row 4	1J11-7	GRY-BLU	Solenoid 6 (1D30) / 5J1-3
1J10-7	WHT-ORG	Switch Row 3	1J11-8	GRY-VIO	Solenoid 7 (1D36) / 5J1-2
1J10-8	WHT-RED	Switch Row 2	1J11-9	GRY-BLK	Solenoid 8 (1D37) / 5J1-1
1J10-9	WHT-BRN	Switch Row 1			
1J12-1	BRN-BLK	Solenoid 9 (G17) / 5J2-9	1J13-1	BLK	Solenoid Ground / 5J10-1
1J12-2	BRN-RED	Solenoid 10 (Q26) / 5J2-8	1J13-2	BLK	" / 5J10-2
1J12-3	Key Pin	No Connection	1J13-3	BLK	" / 5J10-3
1J12-4	BRN-ORG	Solenoid 11 (Q18) / 5J2-7	1J13-4	BLK	" / 5J10-4
1J12-5	BRN-YEL	Solenoid 12 (Q9) / 5J2-6	1J14-1	BLK-RED	Memory Protect / 7J1-4
1J12-6	BRN-GRN	Solenoid 13 (Q15) / Mys. Wht Mo Cntrl	1J14-2	WHT	Ground / 7J1-3
1J12-7	BRN-BLU	Solenoid 14 (Q7) / Mys. Wht Mo Cntrl	1J14-3	GRY	ADVANCE Switch / 7J1-1
1J12-8	BRN-VIO	Solenoid 15 (Q14) / 5J2-2	1J14-4	BLU	AUTOMANUAL Switch / 7J1-2
1J12-9	BRN-GRY	Solenoid 16 (Q8) / 5J2-1			
1J16-1	RED	Volume Control Input / 11J1-1	1J17-1	BLK	Ground / 5J6-11
1J16-2	BLK	Volume Control Output / 11J1-2	1J17-2	BLK	" / 5J6-12
1J16-3	Key Pin	No Connection	1J17-3	BLK	" / 5J6-13
1J16-4	WHT	Signal Ground - CPU / 11J1-4	1J17-4	GRY	Power: +5V dc / 5J6-7
			1J17-5	GRY	" / 5J6-8
			1J17-6	GRY	" / 5J6-9
1J18-1	--	No Connection	1J17-7	Key Pin	No Connection
1J18-2	ORN-BLK	Spl Sond Sw 3	1J17-8	BLK-WHT	Power: -12V dc Unreg / 5J6-2
1J18-3	ORN-RED	Spl Sond Sw 2	1J17-9	WHT-GRY	Power: +12V dc Unreg / 5J6-4
1J18-4	ORN-YEL	Spl Sond Sw 4			
1J18-5	ORN-BRN	Spl Sond Sw 1	1J19-1	ORN-VIO	Flipper Ground
1J18-6	Key Pin	No Connection	1J19-2	ORN-GRY	Flipper Ground
1J18-7	WHT	Spl Sond Sw Ground	1J19-3	BLU-ORN	Spl Solnd 3 (D73) / 5J5-3
1J18-8	ORN-GRN	Spl Sond Sw 5	1J19-4	BLU-RED	Spl Solnd 2 (D71) / 5J5-6
1J18-9	ORN-BLU	Spl Sond Sw 6	1J19-5	Key Pin	No Connection
			1J19-6	BLU-YEL	Spl Solnd 4 (D69) / 5J5-4
1J21		Ribbon Cable to Audio Board 11J4	1J19-7	BLU-BRN	Spl Solnd 1 (D75) / 5J5-7
1J22		Ribbon Cable to Master Display Board 4J3	1J19-8	BLU-GRN	Spl Solnd 5 (D77) / 5J5-2
			1J19-9	BLU-BLK	Spl Solnd 6 (D79) / 5J5-1

POWER SUPPLY INTERBOARD SIGNALS

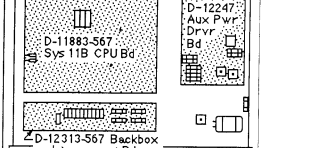
Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
3J1-1	BLK	Ground / 1J17-1	3J2-1	ORG	Display Power: -100V dc / 4J2-1
3J1-2	BLK	Ground / 1J17-2	3J2-2	--	No Connection
3J1-3	BLK	Ground / 1J17-3	3J2-3	BRN	Display Power: +100V dc / 4J2-3
3J1-4	BLK	No Connection	3J2-4	Key Pin	No Connection
3J1-5	BLK/YEL	Logic Ground	3J2-5	BLK	Ground (Display ckt) / 4J2-5
3J1-6	GRY	CPU Pwr: +5V dc Reg / 1J17-4	3J2-6	GRY	Display Power: +5V dc /4J2-6
3J1-7	GRY	" / 1J17-5			
3J1-8	GRY	" / 1J17-6	3J3-1	GRY	Transformer: 19.4V ac, 1Ø, C. T.
3J1-9	GRY	No Connection	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 / 1J17-9	3J3-4	GRY/WHT	Transformer: 19.4V ac, C. T. com
3J1-12	WHT/GRY	CPU Pwr: +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	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 / 1J17-8	3J3-8	WHT	Transformer: 68.5V ac
			3J3-9	WHT	Transformer: 68.5V ac

AUDIO BOARD INTERBOARD SIGNALS

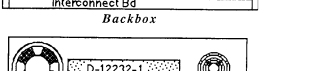
Connector	Wire Color	Signal Designation/Description	Connector	Wire Color	Signal Designation/Description
11J1		Ribbon Cable from CPU 1J21	11J5-1	BLK/YEL	
			11J5-2	BLK	Signal Level (from Vol Cntrl)
11J2-1	WHT/GRY	Power: +12 Vdc Unreg / 3J6-6	11J5-3	Key Pin	No Connection
11J2-2	WHT/GRY	Power: +12 Vdc Unreg / 3J6-6	11J5-4	--	No Connection
11J2-3	Key Pin	No Connection	11J5-5	RED	Signal Level (to Vol Cntrl)
11J2-4	BLK/WHT	Power: -12 Vdc Unreg / 3J6-2	11J5-6	--	No Connection
11J2-5	BLK	Ground / 3J6-11	11J5-7	RED/BLK	
11J2-6	WHT	Ground / 1J16-4			
			11J6-1	--	No Connection
11J4-1	WHT/GRY	Power: +12 Vdc Unreg / 3J6-6	11J6-2	BLK/YEL	Speaker
11J4-2	Key Pin	No Connection	11J6-3	Key Pin	
11J4-3	WHT/GRY	Power: +12 Vdc Unreg / 3J6-6	11J6-4	BLK / Speaker	
11J4-4	BLK	Ground / 3J6-11			
11J4-5	BLK	Ground / 3J6-11			

MASTER 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	4J3	Ribbon Cable from CPU 1J22	
4J1-2	BRN/VIO	ST-7: Digit Display Strobe / 1J1-2			
4J1-3	BRN/BLU	ST-6: Digit Display Strobe / 1J1-3	4J5-1	BLU/BRN	D1 / Display BCD / 1J3-1
4J1-4	BRN/GRN	ST-5: Digit Display Strobe / 1J1-4	4J5-2	BLU/RED	C1 / Display BCD / 1J3-2
4J1-5	BRN/YEL	ST-4: Digit Display Strobe / 1J1-5	4J5-3	BLU/ORG	B1 / Display BCD / 1J3-3
4J1-6	BRN/ORG	ST-3: Digit Display Strobe / 1J1-6	4J5-4	BLU/YEL	A1 / Display BCD / 1J3-4
4J1-7	BRN/RED	ST-2: Digit Display Strobe / 1J1-7	4J5-5	BLU/GRN	D2 / Display BCD / 1J3-5
4J1-8	Key Pin	No Connection	4J5-6	Key Pin	No Connection
4J1-9	BRN/BLK	ST-1: Display Digit Strobe / 1J1-9	4J5-7	BLU/BLK	C2 / Display BCD / 1J3-7
			4J5-8	BLU/VIO	B2 / Display BCD / 1J3-8
4J2-1	VIO/GRY	ST-16: Digit Display Strobe / 1J2-1	4J5-9	BLU/GRY	A2 / Display BCD / 1J3-9
4J2-2	VIO/BLK	ST-15: Display Digit Strobe / 1J2-2			
4J2-3	VIO/BLU	ST-14: Display Digit Strobe / 1J2-3	4J7-1	ORG	Display Power: -100V dc / 3J5-3
4J2-4	VIO/GRN	ST-13: Display Digit Strobe / 1J2-4	4J7-2	--	No Connection
4J2-5	VIO/YEL	ST-12: Display Digit Strobe / 1J2-5	4J7-3	BRN	Display Power: +100V dc / 3J5-4
4J2-6	VIO/ORG	ST-11: Display Digit Strobe / 1J2-6	4J7-4	Key Pin	No Connection
4J2-7	Key Pin	No Connection	4J7-5	BLK	Ground / 3J5-1
4J2-8	VIO/RED	ST-6: Display Digit Strobe / 1J2-8	4J7-6	GRY	Power: +5V dc / 3J5-6
4J2-9	VIO/BRN	ST-9: Display Digit Strobe / 1J2-9			



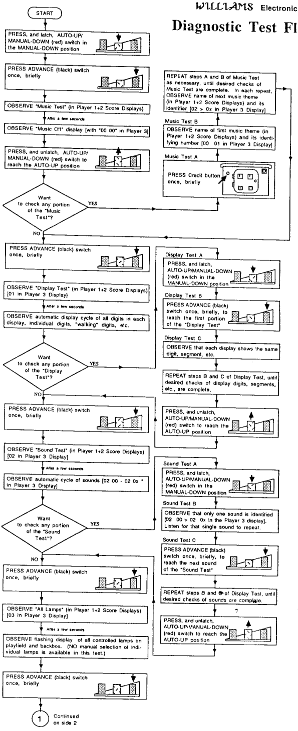
Backbox



Display/Speaker Panel

WILLIAMS Electronics Games

Diagnostic Test Flowchart



PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Music Test" (in Player 1+2 Score Displays)

After a few seconds

OBSERVE "Music Off" display [with "00 00" in Player 3]

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

Want to check any portion of the "Music Test"?

Music Test A

PRESS Credit button once, briefly

Music Test B

OBSERVE name of first music theme (in Player 1+2 Score Displays) and its identifying number [00 01 in Player 3 Display]

REPEAT steps A and B of Music Test as necessary, until desired checks of Music Test are complete. In each repeat, OBSERVE name of next music theme (in Player 1+2 Score Displays) and its identifier [02 > 0x in Player 3 Display]

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Display Test" (in Player 1+2 Score Displays) [01 in Player 3 Display]

After a few seconds

OBSERVE automatic display cycle of all digits in each display, individual digits, "walking" digits, etc.

Want to check any portion of the "Display Test"?

Display Test A

PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position

Display Test B

PRESS ADVANCE (black) switch once, briefly, to reach the first portion of the "Display Test"

Display Test C

OBSERVE that each display shows the same digit, segment, etc.

REPEAT steps B and C of Display Test, until desired checks of display digits, segments, etc., are complete.

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

PRESS ADVANCE (black) switch once, briefly

OBSERVE "Sound Test" (in Player 1+2 Score Displays) [02 in Player 3 Display]

After a few seconds

OBSERVE automatic cycle of sounds [02 00 - 02 0x " in Player 3 Display]

Want to check any portion of the "Sound Test"?

Sound Test A

PRESS, and latch, AUTO-UP/MANUAL-DOWN (red) switch in the MANUAL-DOWN position

Sound Test B

OBSERVE that only one sound is identified [02 00 > 02 0x in the Player 3 display]. Listen for that single sound to repeat.

Sound Test C

PRESS ADVANCE (black) switch once, briefly, to reach the next sound of the "Sound Test"

REPEAT steps B and C of Display Test, until desired checks of sounds are complete.

PRESS, and unlatch, AUTO-UP/MANUAL-DOWN (red) switch to reach the AUTO-UP position

PRESS ADVANCE (black) switch once, briefly

OBSERVE "All Lamps" (in Player 1+2 Score Displays) [03 in Player 3 Display]

After a few seconds

OBSERVE flashing display of all controlled lamps on playfield and backbox. (NO manual selection of individual lamps is available in this test.)

PRESS ADVANCE (black) switch once, briefly

1 Continued on side 2

Diagnostic Test Flowchart (Side 1)

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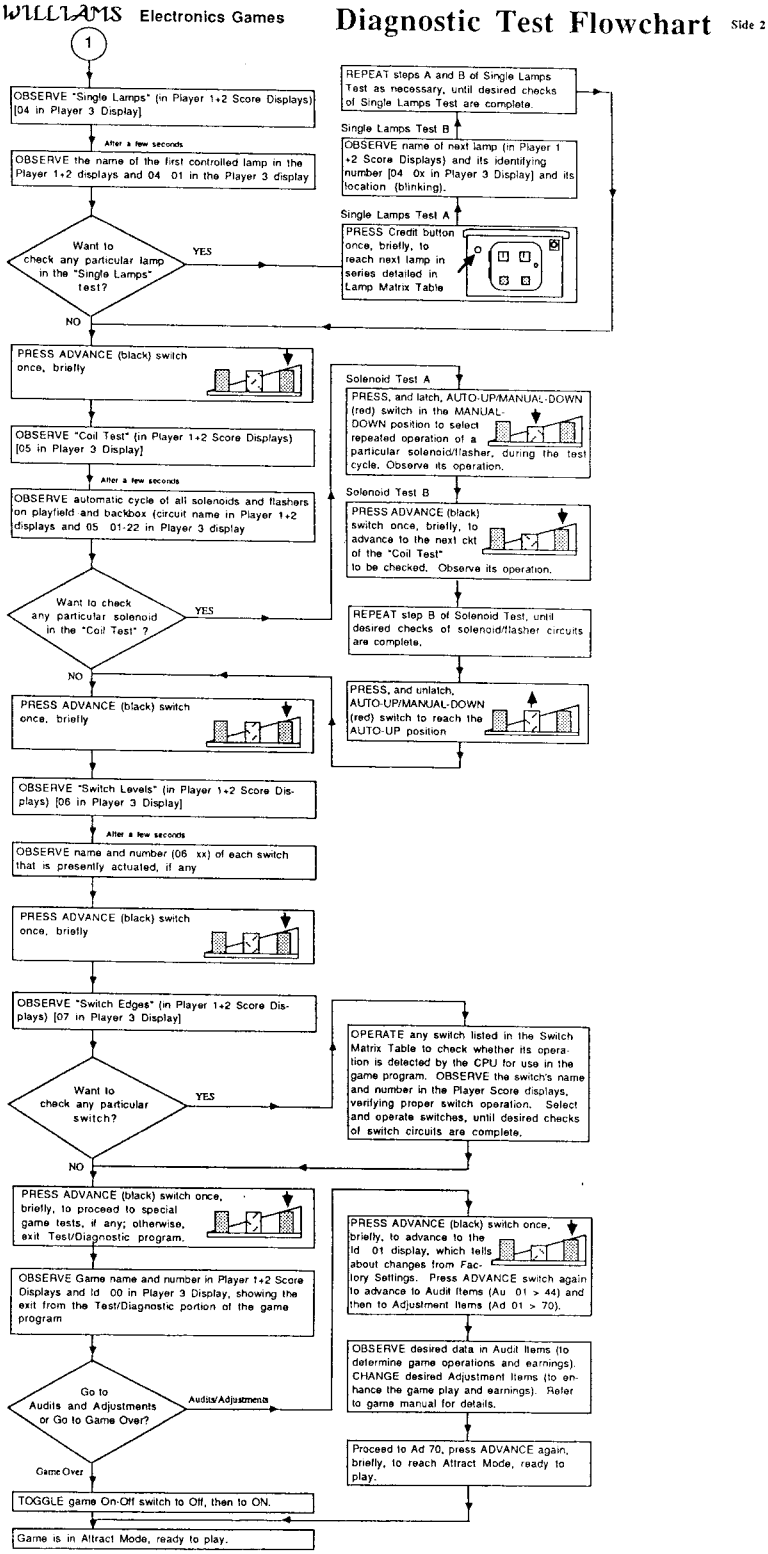
Diagnostic Test Flowchart

Side 2



JOKERZ Lamp-Matrix Table

COLUMN / ROW	1 Q66 YEL-BRN 1J7-1	2 Q64 YEL-RED 1J7-2	3 Q62 YEL-ORN 1J7-3	4 Q60 YEL-BLK 1J7-4	5 Q58 YEL-GRN 1J7-6	6 Q56 YEL-BLU 1J7-7	7 Q54 YEL-VIO 1J7-8	8 Q52 YEL-GRY 1J7-9
Q80 1 RED-BRN 1J6-1	BONUS (left) 1K 1	BONUS 10K (TR) 9	**B** of BET 17	Drop Target (BL) 25	Spinners 3,000 33	Hearts 41	JACKPOT ** 49	0.5 Million Jackpot (BG) 57
Q81 2 RED-BLK 1J6-2	BONUS 1K 2	BONUS 50K 10	**E** of BET 18	Drop Target (BR) 26	Draw Poker 34	Spades 42	DEAL AGAIN 50	1.0 Million Jackpot (BG) 58
Q82 3 RED-ORN 1J6-3	BONUS 1K 3	2X 11	**T** of BET 19	Drop Target (TL) 27	Special 35	Clubs 43	UPF Illum (left) 51	1.5 Million Jackpot (BG) 59
Q83 4 RED-YEL 1J6-5	BONUS (right) 1K 4	3X 12	Left Outlane 20	**Ace** UPF 28	1 Bell 36	Diamonds 44	UPF Illum 52	2.0 Million Jackpot (BG) 60
Q84 5 RED-GRN 1J6-6	BONUS 5K 5	4X 13	L Return Lane 21	**King** UPF 29	2 Bells 37	Left Ramp 45	UPF Illum 53	2.5 Million Jackpot (BG) 61
Q85 6 RED-BLU 1J6-7	BONUS 10K (BL) 6	5X 14	R Return Lane 22	**Queen** UPF 30	3 Bells 38	Right Ramp 46	UPF Illum 54	3.0 Million Jackpot (BG) 62
Q86 7 RED-VIO 1J6-8	BONUS 10K (BR) 7	6X 15	Right Outlane 23	**Jack** UPF 31	4 Bells 39	Left Jet's 10K 47	UPF Illum 55	3.5 Million Jackpot (BG) 63
Q87 8 RED-GRY 1J6-9	BONUS 10K (TL) 8	7X 16	Double Scores (when Flashing) 24	**10** UPF 32	5 Bells Lites Special 40	Right Jet's 10K 48	UPF Illum (right) 56	4.0 Million Jackpot (BG) 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield BG = Backglass ** = 2 Lamps

JOKERZ Switch-Matrix Table

COLUMN / ROW	1 Q45 GRN-BRN 1J8-1	2 Q49 GRN-RED 1J8-2	3 Q44 GRN-ORN 1J8-3	4 Q48 GRN-YEL 1J8-4	5 Q43 GRN-BLK 1J8-5	6 Q47 GRN-BLU 1J8-7	7 Q42 GRN-VIO 1J8-8	8 Q46 GRN-GRY 1J8-9
1 WHT-BRN 1J10-9	Plumb Bob Tilt 1	Playfield Tilt 9	**B** of BET 17	BL 3-Bank DT (top) 25	33	TL 3-Bank DT (top) 41	Left Ramp Score 49	Lane Change Right 57
2 WHT-RED 1J10-8	C Side Power A/C Relay 2	Outhole 10	**E** of BET 18	BL 3-Bank DT (mid) 26	34	TL 3-Bank DT (mid) 42	Right Ramp Score 50	Lane Change Left 58
3 WHT-ORN 1J10-7	Credit Button 3	Ball Trough #1 11	**T** of BET 19	BL 3-Bank DT (bottom) 27	35	TL 3-Bank DT (bottom) 43	51	Draw Poker Home Backglass 59
4 WHT-YEL 1J10-6	Left Coin Chute 4	Ball Trough #2 12	Left Outlane 20	**Ace** UPF 28	BR 3-Bank DT (top) 36	TL Kicker 44	Ramp RAISE 52	Left Jet Bumper 60
5 WHT-GRN 1J10-5	Center Coin Chute 5	Ball Trough #3 13	Left Return Lane 21	**King** UPF 29	BR 3-Bank DT (mid) 37	Left Lock 1 Ball 45	10 pt (TR) 53	Right Jet Bumper 61
6 WHT-BLU 1J10-3	Right Coin Chute 6	Ball Shooter 14	Right Return Lane 22	**Queen** UPF 30	BR 3-Bank DT (bottom) 38	Left Lock 2 Balls 46	54	Lower Jet Bumper 62
7 WHT-VIO 1J10-2	Slam Tilt 7	Ramp UP 15	Right Outlane 23	**Jack** UPF 31	39	TR Eject 47	55	BL Kicker ("sling") 63
8 WHT-GRY 1J10-1	High Score Reset 8	Ramp DOWN 16	Double Score Target 24	**10** UPF 32	40	Spinner 48	10 pt (BR) 56	BR Kicker ("sling") 64

TL = Top Left TR = Top Right BL = Bottom Left BR = Bottom Right UPF = Upper Playfield

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