Williams®

Game No. 1912
August, 1979

KING TUT

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CONTENTS

SECTION 1
INSTALLATION

The initial setup of solid state shuffle alleys is similar to that of mechanical shuffle alleys. Installation consists of assembly and interconnection, inspection, and power turn-on.

ASSEMBLY AND INTERCONNECTION

To assemble and interconnect the shuffle alley proceed as follows:

1. Remove the coin door cabinet and legs from the shipping carton.
2. Install the leg levelers in the legs and mount legs to the coin box using the four acorn bolts.
3. Remove the base and pin assembly from the shipping carton and position it close to its desired location. Leave approximately three feet of space at the rear of the box for access during installation.
4. Remove the back box from the shipping carton and set it aside.
5. Remove the frame assembly from the carton and seat it in the opening in the base; support the coin box end of the frame with a chair or a stand.
6. Secure the frame to the base from the side of the base using the four hex head bolts.
7. Pull the two cable connectors and ground braid from the right hole in the front of the frame.
8. Lift the front of the frame and position the coin box cabinet underneath so that the back edge of the cabinet clears the bolts that secure the molding to the frame.
9. Push the two cable connectors and ground braid through the hole in the rear of the coin box cabinet.
10. Open the coin door and pull the slack from the cables and ground braid into the coin box cabinet while pushing the cabinet into position.
11. Secure the coin box cabinet to the frame assembly using the four bolts and washers.
12. Interconnect the two cable connectors with the corresponding connectors in the coin box cabinet.
13. Attach the ground braid beneath the wing nut and washer.
14. Level the frame from side to side using the leg levelers.
15. Remove the back door from the pin assembly by turning the two wing nuts on the inside, pushing the door top out, and lifting up.
16. Unlock and remove the metal cover from the rear of the back box.
17. Position the back box on top of the pin assembly and secure it using the four hex head bolts and washers.
18. Refer to Figure 1 and connect the four cables from the frame as indicated. Note that proper connections mate wires of the same color.
19. Refer to Figure 1 and connect the three cables from the back box (6P2/6J2, 8P2/8J2, and 8P3/8J3) to connectors from the pin assembly. Note that proper connections mate wires of the same color.
20. Refer to Figure 1 and interconnect the 11P1-8P3-8J4 harness between the Sound Converter Assembly, Driver Board harness, and pin assembly harness.
21. Refer to Figure 1. Check that all other connections in the rear of the back box are securely made. Note that the wire colors for the 6P2 and 6P3 connectors do not match.
22. Refer to Figure 1 and connect the ground braid from the left side of the pin assembly under the wing nut and washer at the left side of the backbox along with the back door ground braid. Similarly connect the ground braid from the right side of the pin assembly, frame ground braid, and playfield ground braid under the wing nut and washer at the right side of the back box.

INSPECTION

Inspection consists of checking that all factory cable connections and socketed integrated circuits (ICs) are firmly seated and a general visual inspection. Proceed as follows:

1. Refer to Figure 2 and gently press on the IC packages that are socketed. **DO NOT** remove any IC packages from their sockets.
2. Push on all connectors attached to the Sound Board (Figure 3 No. 1) and the Sound Converter Assembly (Figure 2, No. 2).
3. Check that the connectors on the cable from the back box to the sound board are secure.
4. Remove the back glass as follows and set it aside. Turn the two wing nuts that secure the back glass retainers, pull the retainers back, and lift the back glass up and out.
5. Push on all connectors that are attached to the Master Display Board, (Figure 4, No. 4) to make sure that they are firmly seated.

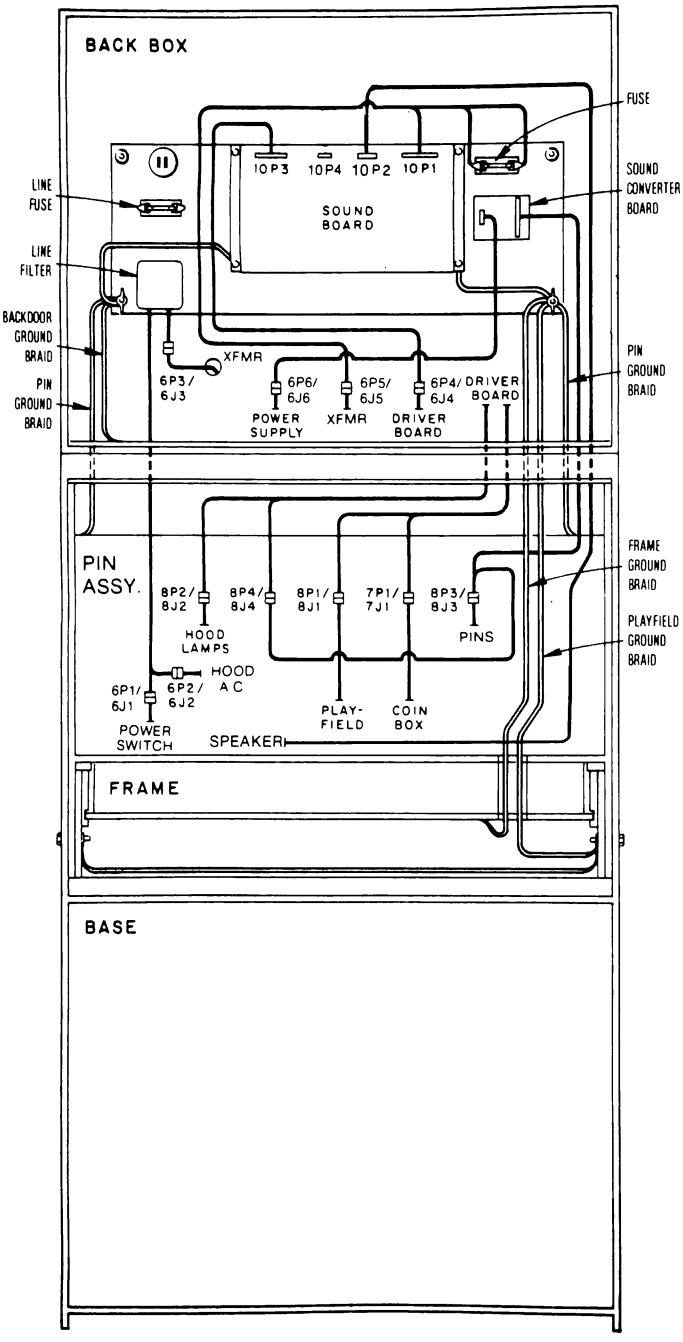


Figure 1. Back Box Cabling Drawing

6. Loosen the screws securing the two insert door latches, slide back the latches, and gently lower the insert door onto the pin assembly hood.
7. Push on all connectors that are attached to the CPU Board (Figure 2, No. 6), Driver Board (Figure 2, No. 7) and Power Supply Board (Figure 2, No. 3) to make sure they are firmly seated. Then check the connections on both bridge rectifiers (Figure 2, No. 10) and the filter capacitor (Figure 2, No. 9).
8. Check the connector between the back box and the insert board and the connector to the transformer to insure that they are secure.
9. Refer to Figure 4 and gently press on the IC packages that are socketed on the CPU and Driver Boards. **DO NOT** remove any of the IC packages from their sockets.
10. Check that the batteries are securely mounted on the CPU Board. **DO NOT REMOVE THE BATTERIES.** If the batteries are removed with power off, the game will revert to factory settings for the different features and desired features will have to be restored manually before the game can be put on location.

NOTE

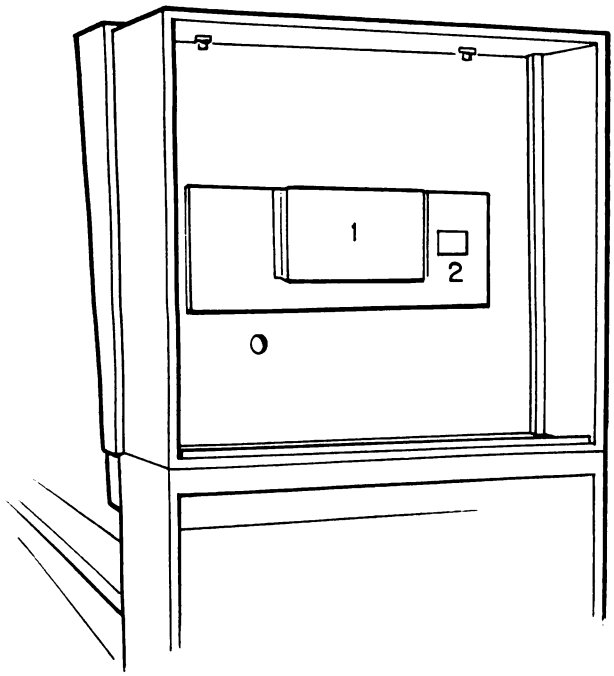
The batteries are all installed with the positive (+) end up. Battery life is about the same as shelf life (approximately one year). When it is time to replace the batteries, remove the batteries while the game is **ON** or the game will revert to factory settings.

11. Check that all cables are clear from moving parts.
12. Check connectors to make sure that no pins have been pushed out or are loose.
13. Check switches for loose solder or other foreign material that may have come loose during shipment.
14. Check that the AC line fuse, the fuses on the Power Supply Board, and the fuses on and adjacent to the Sound Board are secure in their holders.
15. Check adjustment of the Slam Tilt switch on the coin door. Normal adjustment is contacts open 1/32 inch.

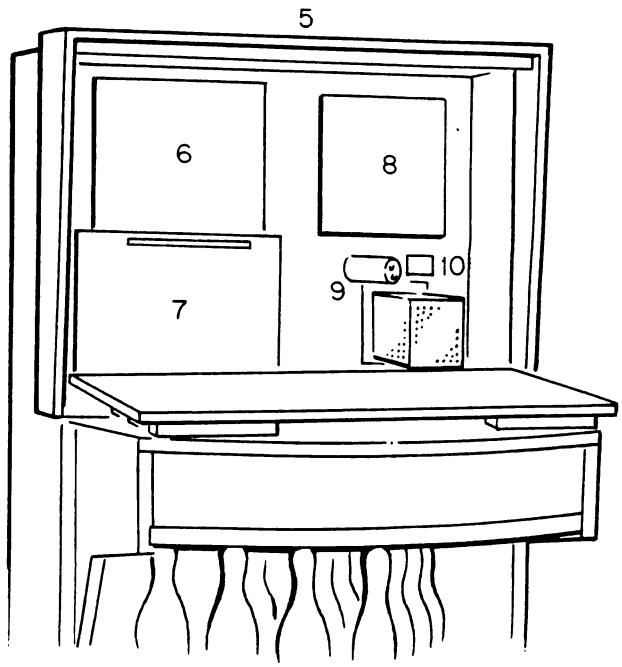
POWER TURN-ON

This machine **MUST BE PLUGGED INTO A PROPERLY GROUNDED OUTLET** to PREVENT SHOCK HAZARD and to insure PROPER GAME OPERATION. **DO NOT** use a "cheater plug" to defect the ground pin on the power cord, and **DO NOT** cut off the ground pin. The line voltage MUST agree with that specified on the shipping carton or serious damage to the game will occur when it is plugged in. To apply power and check out the game, proceed as follows:

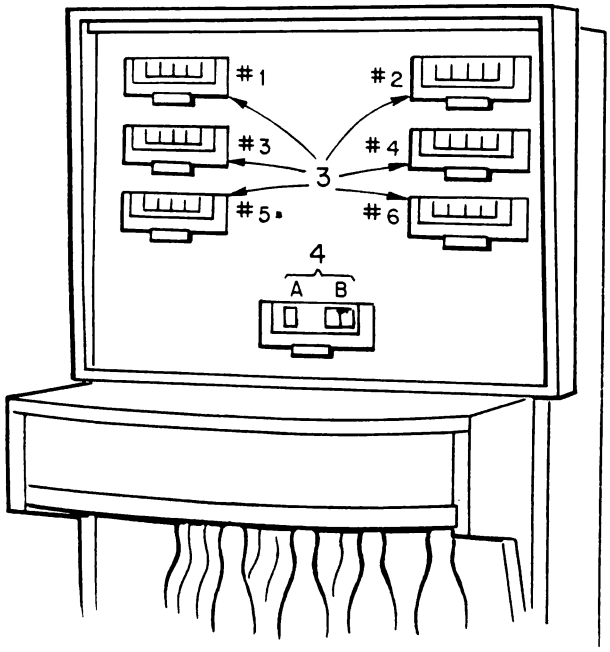
1. Raise the insert door and latch it into position.
2. Plug the power cord into an outlet and turn the power switch (located behind the coin door cabinet) on. The game should come on, the pins reset, the hood lamps light, and the game should be in a game over mode. The game over mode is indicated by player's scores reading zero and game over light flashing. The regulation high score to date alternates with the Player 1 score.



A. REAR VIEW



C. FRONT VIEW, INSERT BOARD LOWERED



B. FRONT VIEW, INSERT BOARD RAISED

LEGEND:

1. SOUND BOARD
2. SOUND CONVERTER BOARD
3. PLAYER DISPLAYS
4. MASTER DISPLAYS
   (A) PLAYERS
   (B) FRAME
5. KEY LOCK
6. CPU BOARD
7. DRIVER BOARD
8. POWER SUPPLY BOARD
9. FILTER CAPACITOR
10. BRIDGE RECTIFIERS

Figure 2. Location of Major Assemblies

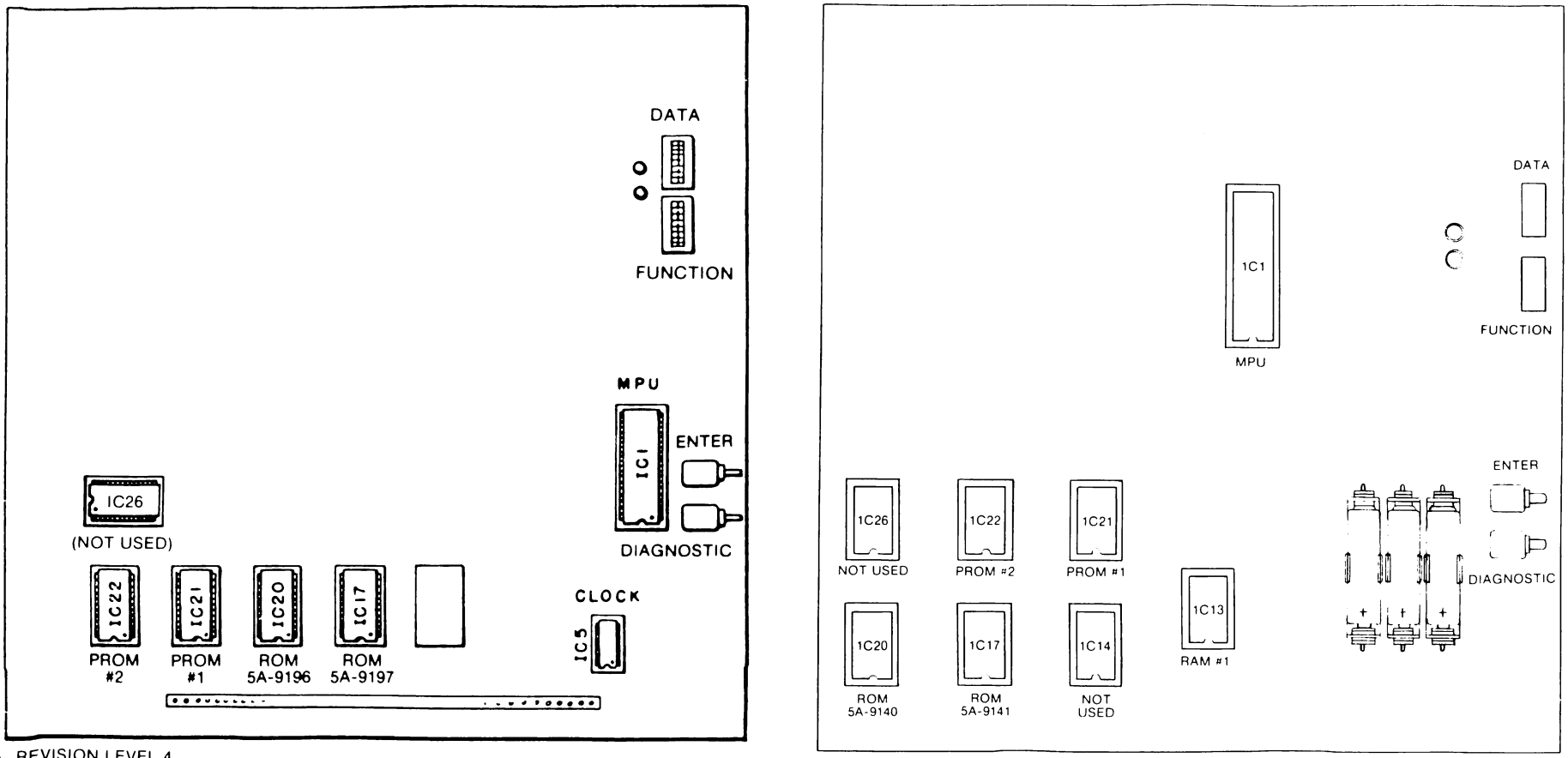


Figure 3. Location of Socketed Components and Switches on CPU

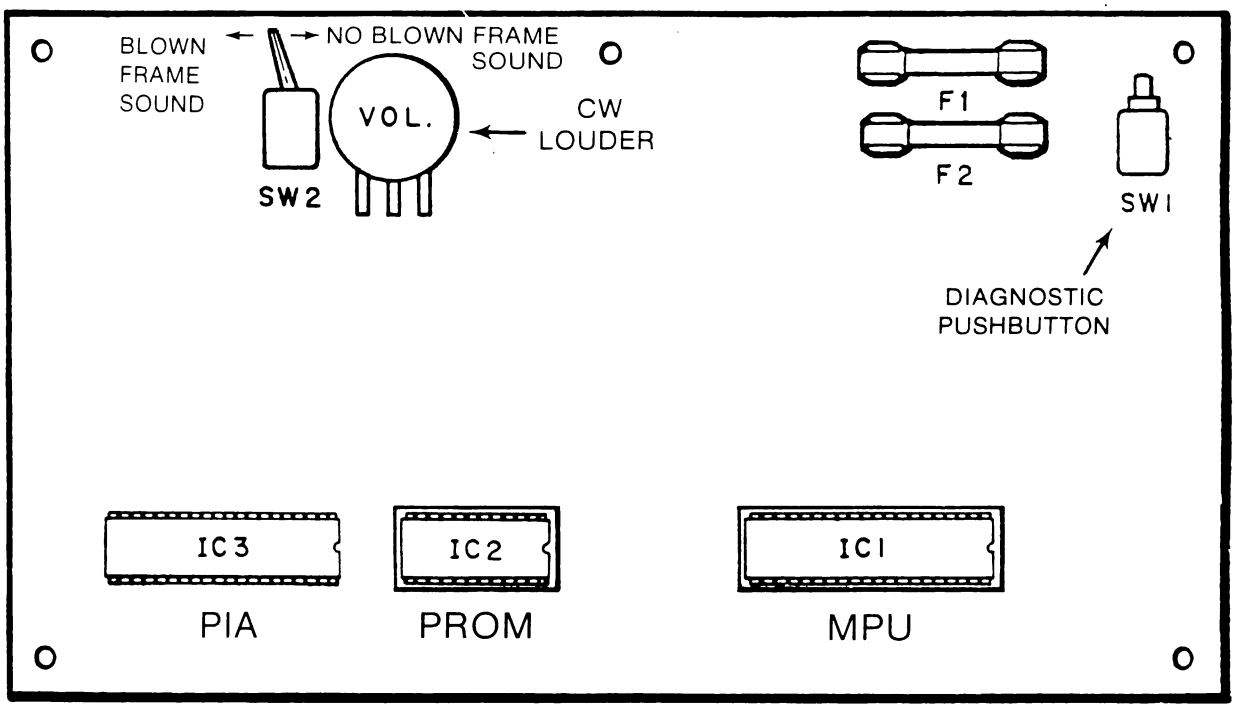


Figure 3. Location of Key Components on Sound Board

3. If the game comes on with the number of players display showing 4 (Figure 2-No. 4A) and the frame display showing 01, 02, etc. (Figure 2-No. 4B), turn the game OFF and then ON again. The game should now come up in the game over mode.

NOTE

Indications in step 3 are a result of the batteries being removed with the power OFF or coming loose during shipment. This has also resulted in features reverting to factory settings and any changes from the factory settings (pricing, beer frames, etc.) must be re-entered using procedures provided in Section 3 of this manual.

4. If the game does not come up in the game over mode after Steps 2 and 3, refer to troubleshooting in Section 6.

5. Perform diagnostic tests in accordance with procedures provided in Section 5 of this manual.

6. Make any desired changes to features in accordance with procedures provided in Section 3 of this manual.

7. With the insert door latched into position, secure the latches with the screws.

8. Re-insert the backglass and secure it in position with the backglass retainers and wing nuts.

9. Re-install the pin assembly back door with the power cord in the slot at the top and secure the door from the inside with the wing nuts.

10. Re-install the metal back on the back box and lock it with the key lock.

11. Verify proper game operation using Section 2 as a guide.

SECTION 2
GAME OPERATION

There are five different games that may be selected. Press the button on the right side of the coin box cabinet at the start of the game to select the type of scoring desired.

REGULATION PLAY: Scoring is identical to official bowling.

PYRAMID: Scores 100 for a strike, 50 for a spare. Each strike advances Pyramid lamps. When "P" lights upon third strike, player gets extra frame. Extra frame scores 800 for a strike and 500 for a spare.

FLASH SCORING: Strike and spare scores are indicated by flashing lites. Lites stop flashing when the pins are hit on first shot.

STRIKE - 90: This game scores 90 for a strike, 60 for a spare. Player continues to shoot as long as he makes a strike. There is no "third ball" in the 10th frame.

800: Scores 80 for a strike, 40 for a spare. If a strike stops the flashing lights in the red, player shoots again with scoring as indicated on board glass (advances from 300/100 to 800/500 for each normal frame striking the red). There is no "third ball" in the 10th frame.

SECTION 3
GAME ADJUSTMENTS

The solid state shuffle alley has been designed to allow the operator to customize the game for location requirements. A simple four step procedure allows the operator to change the game features without the need to solder or unsolder wires. This section explains this four step procedure and then goes on to explain all the features which can be changed.

Prior to starting, first remove the backglass and then lower the insert door. Behind the insert door are three circuit boards. The upper left board is the CPU Board. On the top right side are two 8 position miniature slide switches and just to the left are two red LEDs (light emitting diodes). On the lower right are two miniature pushbuttons. These components will be used in making game adjustments. (Refer to Chart 1 for illustration of switches, pushbuttons, and LEDs).

STEP 1
The first step in making any change to a feature is to place the shuffle alley into its built-in diagnostics (self-tests). This is done by pressing the lower pushbutton on the CPU Board. This is the diagnostic start switch or pushbutton. After this pushbutton is pressed and released the two LEDs will blink slowly 2 times and then go OFF. If either LED or both come ON and stay ON continuously, refer to the troubleshooting section in this manual.

NOTE: It is not necessary to depress the DIAGNOSTIC pushbutton more than one time to make any number of changes.

STEP 2
The second step in making a change to a feature is to identify which game feature is to be changed. Table 1 identifies the 20 different features that can be changed. A number identifying the feature must be set on the bottom of the two 8 position miniature slide switches. This switch is called the function switch and Chart 1 shows which positions must be ON and which positions must be OFF for the number to be entered. For example, to set the number 12 on the function switch, use Chart 1 and set the switch exactly like the switch shown to the right of number 12 in Chart 1. In this case switches 5 and 6 would be ON (move switch to left) and all others (1, 2, 3, 4, 7, 8) would be OFF (move switch to right).

STEP 3
The third step in making a change to a feature is to enter a new value for that feature. This new value is called the data value and it is entered on the top of the two 8 position miniature slide switch. This switch is called the data switch and Chart 2 shows which position must be ON or OFF for the number to be entered. Chart 2 is used for data values. For example, to set the number 01 on the data switch, use Chart 2 and set the top switches exactly like the switch shown to the right of number 1 in Chart 2. In this case, switch 8 would be ON (move switch to the left) and all others (1, 2, 3, 4, 5, 6, 7) would be OFF (move switch to right).

STEP 4
The fourth step in making a change to a feature is to lock the new value for the feature into the computer's memory. This is done by simply depressing the top pushbutton for 1 second and then releasing it. The two LEDs will blink once to indicate that the new value has been entered. This top pushbutton is called the ENTER pushbutton. Turn all switches on data and function switches OFF (move switch to right).

This completes the four steps required to make any changes. Continue to enter any other changes desired by checking the other features in Table 1. Set the function switch number for that feature on the function switch using Chart 1. Then determine the new data desired, and refer to Chart 2 and set the data switch accordingly. Then press the ENTER pushbutton (top pushbutton) once to lock in the new data. Continue to repeat this procedure for all changes.

The functions can be entered in any order. If a mistake is made in setting the data switches, the correct settings can be made and the ENTER button pressed again to enter the new data. Only the last data entered will be retained. If the batteries are removed with the game turned OFF, all the changes made to the various features will be lost and the game will be restored to the factory settings.

There are two ways to verify the data changes entered. One is to turn the game OFF then ON again and then to play the game to see if the changes are correct. A faster method is to use Test 4 of the built-in diagnostics to read out the changes and this method is described in Section 5 of this manual.

The following is a summary of all adjustable game features.

BEER FRAME

The first feature that can be changed is the beer frame. From the factory, the 5th frame is the beer frame. This can be changed to any frame except the 10th frame. More than 1 beer frame can be entered. **For example,** in addition to the 5th frame, frame 3 could also be a beer frame.

1. **If not already in diagnostics,** enter diagnostics by pressing lower pushbutton on CPU Board once.
2. Set up function switch (bottom) exactly like number 01, 02, 03, 04, 05, 06, 07, 08, or 09 using Chart 1.
3. Set up data switch (top) exactly like number 00 (No beer frame) or 01 (Beer Frame) using Chart 2.
4. Press and hold for 1 second the ENTER button. The LEDs will blink once to indicate that the new data is locked in. Turn all functions and data switches off (move switches to right).

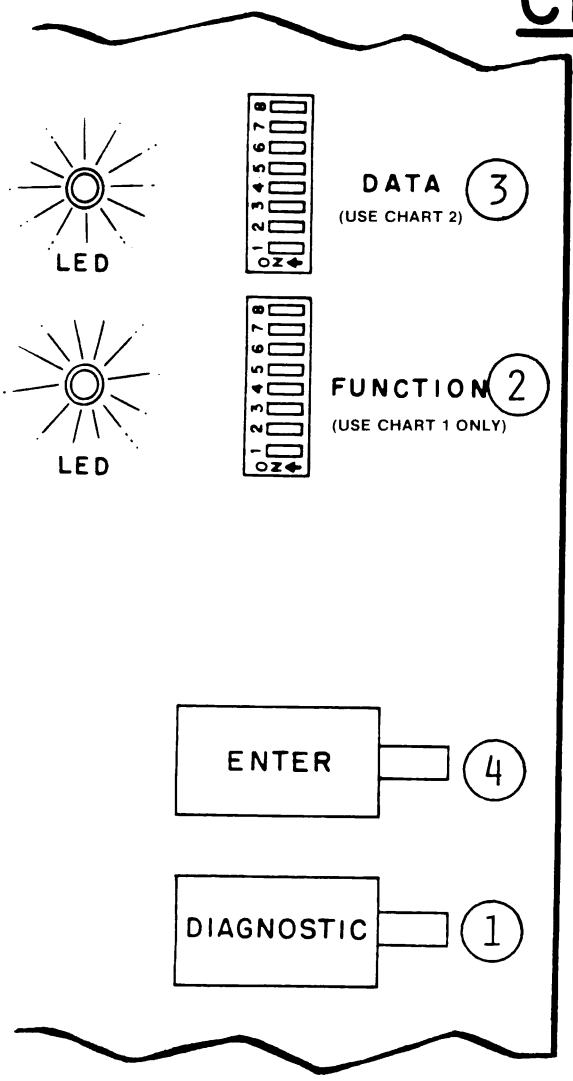
For the example cited above, in step 2 the number 03 would have been set on the function switch (using Chart 1) and in step 3 number 01 would have been set on the data switch (using Chart 2). After doing the four steps above using these values and turning the game OFF then ON again and playing the game, the beer frame lights would come on during the 3rd and 5th frame.

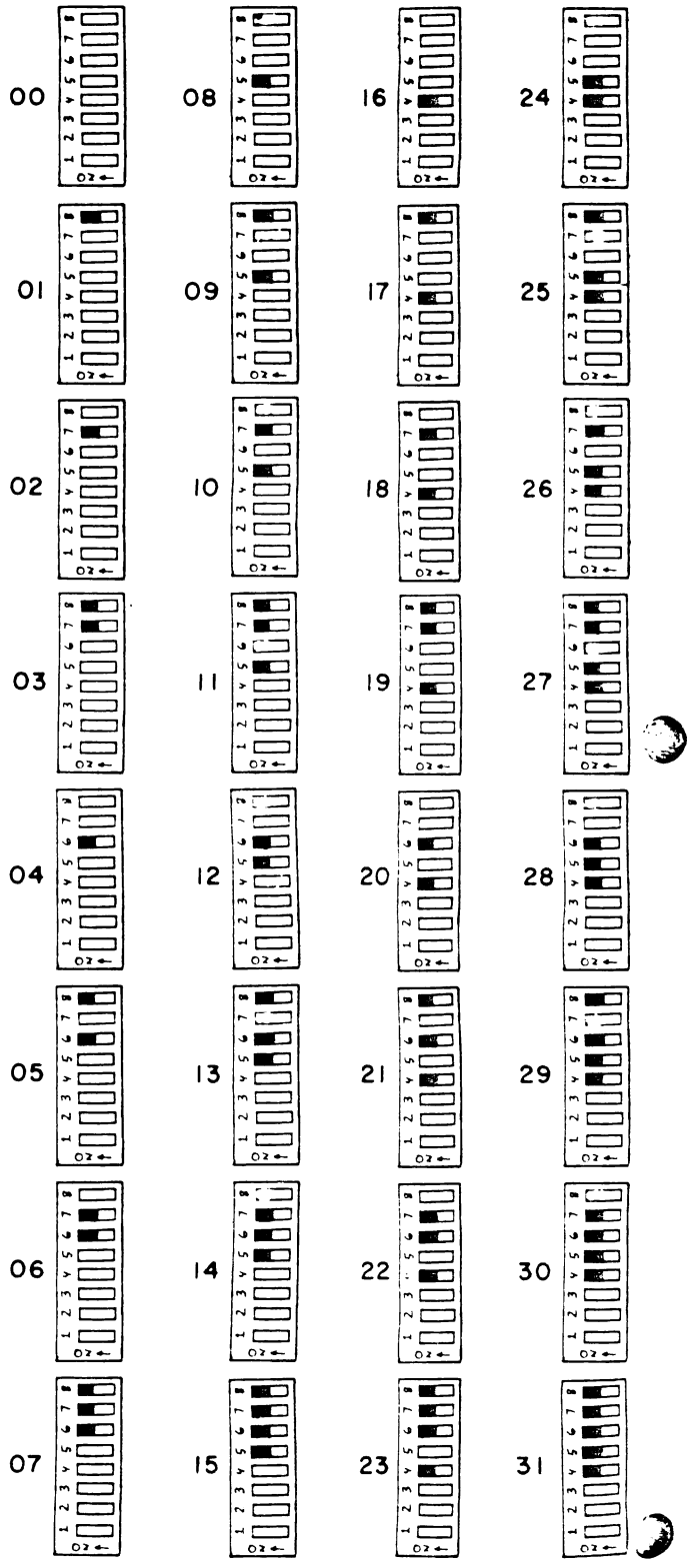
MAXIMUM CREDITS

This feature controls how many coins can be put into the game before the coin lockout relay is released. The factory setting is 20 credits. According to Table 1, the function switch number for this feature is 10. Any number from 1 thru 99 can be entered for the data. **For example,** to allow only 15 credits to be posted at a time, the following four steps should be performed.

1. If not already in diagnostics, enter diagnostics by pressing lower pushbutton on CPU Board once.

CHART 1





GAME ADJUSTMENT PROCEDURE

1. Depress DIAGNOSTIC switch and check that LEDs flash twice and that all displays are blank.
2. Set FUNCTION switch according to Chart 1.
3. Set DATA switch according to Chart 2.
4. Depress ENTER switch and check that LEDs flash once.
5. Repeat steps 2 through 4 for additional adjustments, as required.
6. After all changes have been entered, verify adjustments using Test 4 as described in Section 5 or, alternately, verify by playing the game.

NOTE

DO NOT depress the DIAGNOSTIC push-button more than one time when making a number of changes.

Table 1. Game Adjustment Values for Shuffle Alleys

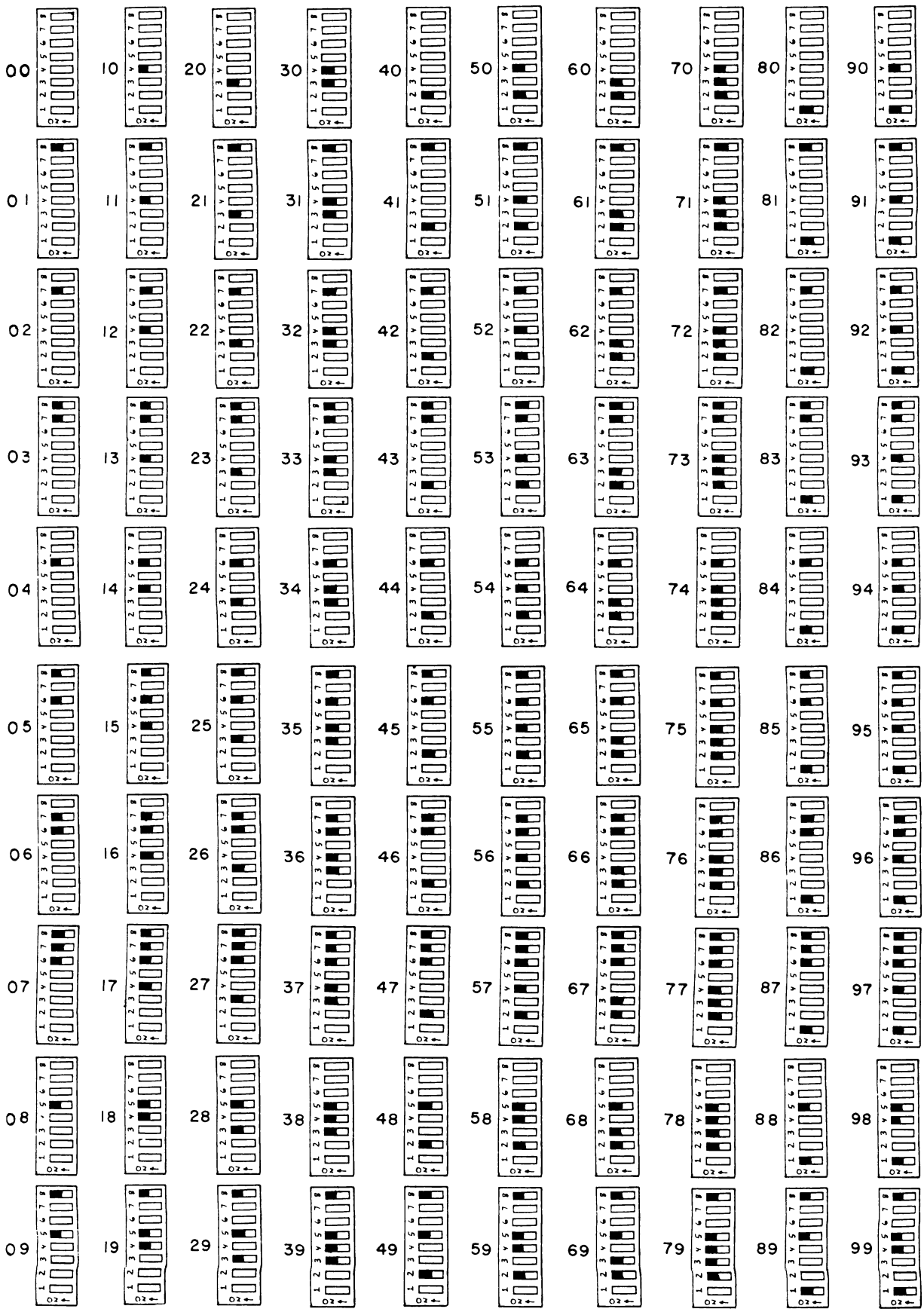
SHUFFLE ALLEY

Test 4 Readout	Function Switch (Use Chart 1)	Data Switch (Use Chart 2)	Factory Setting	This Game
01	01	Beer Frame 1 *	00	_____
02	02	Beer Frame 2 *	00	_____
03	03	Beer Frame 3 *	00	_____
04	04	Beer Frame 4 *	00	_____
05	05	Beer Frame 5 *	01	_____
06	06	Beer Frame 6 *	00	_____
07	07	Beer Frame 7 *	00	_____
08	08	Beer Frame 8 *	00	_____
09	09	Beer Frame 9 *	00	_____
		* 00-No Beer Frame		
		01-Beer Frame		
10	10	Maximum Credits	20	_____
11	11	Strike Difficulty	00	_____
		00-Easy		
		01-Hard		
12	12	7-10 Pickup	00	_____
		00-Easy		
		01-Hard		
13	13	** Lowest Coin Multiplier	01	_____
14	14	** Middle Coin Multiplier	01	_____
15	15	** Highest Coin Multiplier	01	_____
16	16	** Minimum Coin Units for Credit	00	_____
17	17	** Coin Units Bonus Point	00	_____
18	18	** Coin Units per Credit	01	_____
19	19	High Score to Date (Hnds)	02	_____
	20	High Score to Date (Units)	00	_____
20	—	Coins in Left Chute		Cannot be set
21	—	Coins in Center Chute		Cannot be set
22	—	Coins in Right Chute		Cannot be set
23	—	Total Credits Paid		Cannot be set
24		*** Number of Game 1 Played		
25		*** Number of Game 2 Played		
26		*** Number of Game 3 Played		
27		*** Number of Game 4 Played		
28		*** Number of Game 5 Played		

** To set game pricing see Table 2.

*** Can be reset to zero: See Text in Section 4 - Game Bookkeeping

CHART 2


00 10 20 30 40 50 60 70 80 90
01 11 21 31 41 51 61 71 81 91
02 12 22 32 42 52 62 72 82 92
03 13 23 33 43 53 63 73 83 93
04 14 24 34 44 54 64 74 84 94
05 15 25 35 45 55 65 75 85 95
06 16 26 36 46 56 66 76 86 96
07 17 27 37 47 57 67 77 87 97
08 18 28 38 48 58 68 78 88 98
09 19 29 39 49 59 69 79 89 99

2. Set up the function switch (bottom) exactly like switch number 10 in Chart 1.
3. Set up the data switch (top) exactly like switch number 15 in Chart 2.
4. Press and hold in for 1 second the ENTER button. The LEDs will blink once to indicate that the new data is locked in. Turn all function and data switches off (move switches to right).

For any value from 1 thru 99, follow the four steps, substituting the value desired in step 3.

STRIKE DIFFICULTY

This feature makes the strike difficulty either easy pickup or hard pickup. The factory setting is easy pickup. According to Table 1, the function switch number for this feature is 11. **For example,** to make the strike pickup more difficult, proceed as follows:

1. **If not already in diagnostics,** enter diagnostics by pressing the lower pushbutton on the CPU Board once.
2. Set up the function switch (bottom) exactly like switch number 11 in Chart 1.
3. Set up the data switch (top) exactly like switch number 01 for hard pickup or number 00 for easy pickup using Chart 2.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all functions and data switches off (move switches to right).

In changing from easy to hard pickup, playfield switches numbered 29 and 32 are disabled, making the strike pickup more difficult.

7 - 10 DIFFICULTY

This feature makes the 7-10 pickup difficulty either easy pickup or hard pickup. The factory setting is easy pickup. According to Table 1, the function switch number for this feature is 12. **For example,** to make the 7-10 pickup more difficult, proceed as follows:

1. **If not already in diagnostics,** enter diagnostics by pressing the lower pushbutton on the CPU Board once.
2. Set up the function switch (button) exactly like switch number 12 in Chart 1.
3. Set up the data switch exactly like number 01 for hard pickup or number 00 for easy pickup using Chart 2.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all function and data switches off (move switches to the right).

In changing from easy to hard pickup, the timing interval allowed for making playfield switches numbered 23 and 24 or numbered 33 and 34 is decreased, making the 7-10 pickup more difficult.

HIGH SCORE TO DATE

The high score to date feature displays the highest score to date for regulation play only. The high score to date can be reset to 200 by the keyswitch on the right side of the coin box assembly. It can also be set to any value desired using Table 1 function number 20 for the units and tens values and function number 19 for the hundreds value. **For example,** to make the high score to date 285, the following steps must be followed.

1. **If not already in diagnostics,** enter diagnostics by pressing the lower pushbutton on the CPU Board once.
2. Set up the function switch (bottom) exactly like switch number 19 in Chart 1.
3. Set up the data switch (top) exactly like switch number 2 in Chart 2.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all function and data switches off (move switches to the right).
5. Set up function switch (bottom) exactly like switch number 20 in Chart 1.
6. Set up data switch (top) exactly like switch number 85 in Chart 2.
7. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all functions and data switches off (move switch to the right).

The game should now be turned off and ON. The high score to date will alternate with Player 1 and will be 0285. If another value is desired, enter the corresponding digits in step 3 and step 6. Remember to not enter a value above 0300.

GAME PRICING

Refer to Table 2 at the end of this section for sample game pricing. To use Table 2 first look down the left side of the page till you find the type of coin door in your game.

The game is factory programmed for 1 play for 25¢. Select the price scheme desired for your game. If the price is not shown, you must read the explanation which follows to determine the values that must be set into the various function numbers which control the game pricing. Then follow the step by step procedure shown below for the new price selected.

1. **If not already in diagnostics,** enter diagnostics by pressing the lower pushbutton on the CPU Board once.
2. Set up the function switch (bottom) exactly like switch number 13 in Chart 1.
3. Set up the data switch (top) exactly like the value shown in the column in Table 2 using Chart 2.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all function and data switches off (move switches to the right).
5. Repeat steps 2, 3 and 4 for function numbers 14, 15, 16, 17, and 18 (in step 2) using the values shown in Table 2 for the data switch (in step 3).

   If any function number has a doesn't matter value for the data switch, skip that function number as it doesn't matter for your game. The following is a more in depth explanation of game pricing.

There are six different functions used to set the game pricing. Three pertain to the coin door mechanism and the other three determine how credits are awarded. Since there are many combinations of coin values and coin mechanisms, this explanation will detail how the functions relate to each other and describe sample settings and pricing schemes.

The first step in setting game pricing is to establish the number of coin chutes. There are single, twin, or three chute coin doors. Function 13 will be used for the left coin chute (closest to the hinge on coin door). Function 14 will be used for the center coin chute. Function 15 will be used for the right coin chute. If any given chute is not present, that function number can be ignored. For example, in a twin chute mechanism, the center chute is not used so Function 14 can be ignored.

The second step is to establish the ratio of all the coins for the particular coin door being used. If all the coins are of equal value, they would have a ratio of 1:1:1. If the coins are not equal (as is the case for 5¢, 10¢, 25¢ coin door), establish the ratio by dividing the coin values by the largest number possible which leaves a remainder of zero. For the 5, 10, 25 coin door this number is 5 and the ratio would be 1:2:5. The 25¢ is worth 5 times the 5¢. The 10¢ is worth 2 times the 5¢. These ratios become the values for the data switch for functions 13, 14, and 15. For example, in the twin quarter chute, the ratio is 1:1:1 so that Function 13 would have its data value set to 01, Function 14 does not matter since there is no center chute in a twin quarter chute coin door, and Function 15 would have its data value set to 01.

The relative value of all the coins has now been established. The third step is to determine if there is to be a minimum amount that must be put into the game prior to giving **any** credits. For example, a 75¢ minimum could be established. No credits would be given until at least 75¢ is deposited in the game. The minimum is Function 16. If there is no minimum required, enter a value of 00 on the data switch for Function 16. If a minimum is required, divide it by the same divider used to find the coin ratios. For a twin quarter machine, the number is 25. If 75¢ is required before giving any credits, 75¢ ÷ 25 = 03 so a value of 03 must be entered on the data switch for Function 16. Any minimum can be established, so long as the divider used to reduce the coin values goes into the minimum an even number of times (remainder must equal zero).

The fourth step in establishing game pricing is to determine the number of coins required to get a credit. Function 18 establishes how many coins are required to give a credit. The values entered in Function 13, 14, and 15 are used as a guideline. Each coin dropped through the coin chute will award the number of units as set by Function 13, 14 and 15. For twin quarter chutes, if 1 quarter was required to award 1 credit a 01 would be entered for data for Function 18. If Functions 13, 14, and 15 are doubled, and Function 18 not changed, a coin would award 2 credits, establishing 2 play for 25¢. To easiiy determine the data value for Function 18, use the value entered for the lowest coin value and determine how many lowest value coins must be deposited to award a **single** credit.

The last step is to determine if there is a bonus (free game) to be awarded for depositing more than 1 coin at a time. For example, the factory settings are 1 play 25¢. This means that when the second coin is deposited, no free credit will be awarded. Note that the bonus is awarded only if the second (or additional) coin is deposited prior to the START of the game. Bonus credits is Function 17 and can be disabled by entering a value of 00 for the data switch.

To determine the bonus credit value, use the value entered for Function 18 as follows: To award a bonus for every 2 credits worth of coins, enter double the value of Function 18 and the data for Function 17. To award a bonus credit for every 3 credits worth of coins, enter triple the value of Function 18 as the data for Function 17.

To make any changes to game pricing,

1. **If not already in diagnostics,** enter diagnostics by pressing the lower pushbutton on the CPU Board once.
2. Set up function switch (bottom) exactly like 13, 14, 15, 16, 17, or 18 in Chart 1.
3. Set up data switch (top) for the new value desired using Chart 2.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all function and data switches off (move switches to the right).
5. Repeat steps 2 thru 4 to change any of the other functions, using the correct function number in step 2 and the new data value required in step 3.

Table 2 shows some data values for Functions 13 thru 18 for some of the more common pricing schemes.

Table 2. Price Settings

COIN DOOR MECHANISM	CREDITS	FUNCTION SWITCH (CHART 1) 13	14	15	16	17	18
		DATA SWITCH (CHART 2)					
Twin Quarter	1/25¢ (Factory Setting)	01	04	01	00	00	01
or Quarter,	1/25¢, 5/$1	01	04	01	00	04	01
Dollar, Quarter	1/25c, 3/50¢	01	04	01	00	02	01
	1/50¢	01	04	01	00	00	02
	1/50¢, 3/$1	01	04	01	00	04	02
1DM, 5DM, 2 DM	2/1DM, 5/2DM, 14/5DM	13	65	26	00	65	05
1 Franc, 5 Frank	1/1F, 6/5F	01	00	05	00	05	01
25 Cent,	1/25¢, 4/1G	01	00	04	00	00	01
1 Guilder							
50 Yen, 100 Yen	1/50Y, 2/100Y	01	00	02	00	00	01
	1/100Y	01	00	02	00	00	02

SECTION 4
GAME BOOKKEEPING

There are 10 separate game bookkeeping totals which can be accessed from the coin door (see Figure 5).

With the game in the game over mode, place the coin door diagnostic switch in the MANUAL position. Then press the ADVANCE pushbutton once. This immediately enters the diagnostics at test 4, subtest 19. This displays the current high score to date for regulation play in the Player 1 display. Press the ADVANCE switch again and this advances the diagnostic to subtest 20. This displays the number of coins in the left coin chute. Press the ADVANCE switch again to go to subtest 21, which displays the number of coins in the center coin chute. Press ADVANCE again to go to subtest 22, which displays the number of coins in the right coin chute. Press ADVANCE again to go to subtest 23 which displays the total credits paid.

There are five additional bookkeeping entries which are accessed by pressing the ADVANCE switch. Subtest 24 shows the number of Game 1 played. Subtest 25 shows the number of Game 2 played. Subtest 26 shows the number of Game 3 played. Subtest 27 shows the number of Game 4 played. Subtest 28 shows the number of Game 5 played.

The coin totals are not resettable to zero, therefore a log similar to Figure 6 is recommended. However, the totals for the games played (Functions 24 thru 28) can be reset to zero in the following way. Remove the backglass, lower the insert door, and proceed as follows:

1. Enter diagnostics by pressing the lower pushbutton on the CPU Board once. The LEDs should blink twice and the displays should go blank.
2. Turn all switches off (move switch to right) on both the function (bottom) and data (top) switches.
3. Turn ON switch 1 and 8 on the function switch (move switch to left). Leave switches 2, 3, 4, 5, 6 and 7 OFF.
4. Press and hold in for 1 second the ENTER pushbutton. The LEDs will blink to indicate that the new data is locked in. Turn all function and data switches OFF (move switches to right).
5. Immediately turn game OFF. Turn game On then OFF **again.** Turn game ON.

The game played totals have been cleared. To return to game over after reading out the bookkeeping totals, turn game OFF then ON.

Test 4

Readout No.	**Player 1 Displays**
19	High Score to Date (Regulation)
20	Coins in Left Coin Chute
21	Coins in Center Coin Chute
22	Coins in Right Coin Chute
23	Total Credits Paid
24	Number of Game 1 Played
25	Number of Game 2 Played
26	Number of Game 3 Played
27	Number of Game 4 Played
28	Number of Game 5 Played

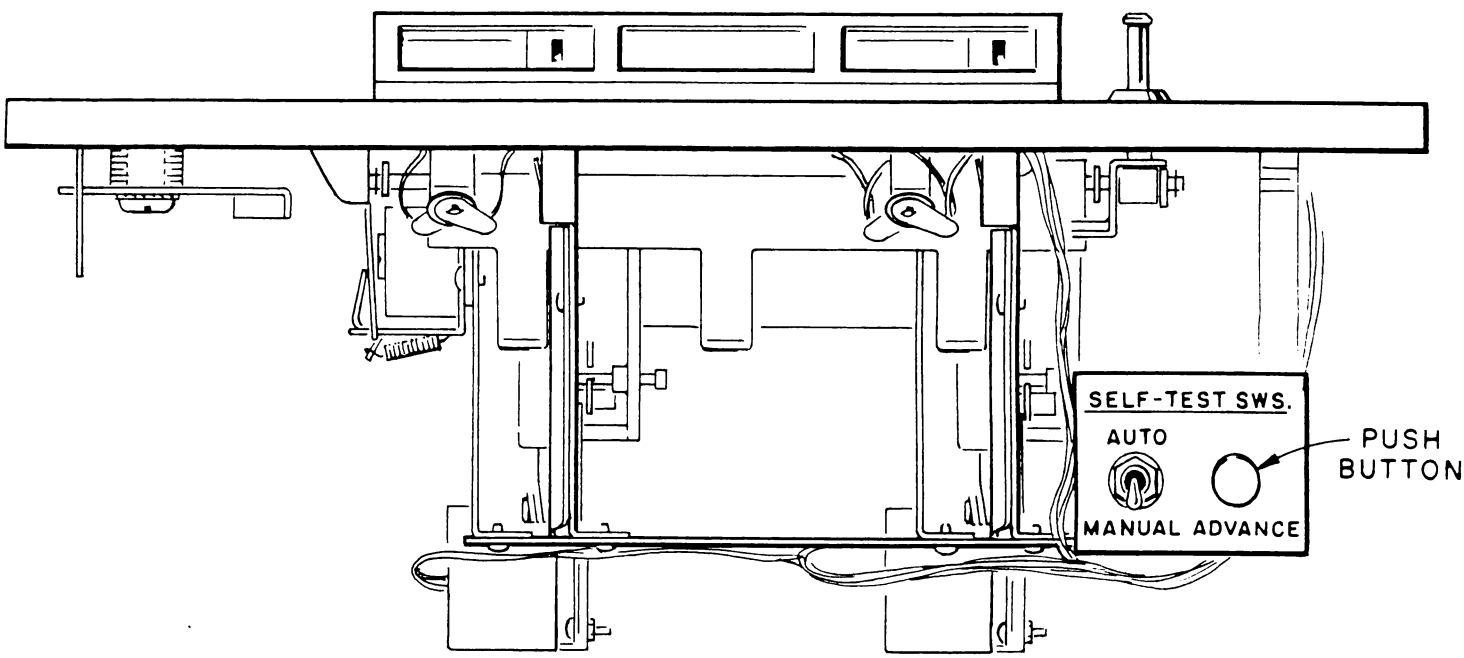


Figure 5. Location of Coin Door Diagnostic Switches

GAME ________________ **SERIAL NUMBER** ________________

	Collected			Totals to Date			Credits			High Score To Date	
Date	Slot 1	Slot 2	Slot 3	Slot 1	Slot 2	Slot 3	Paid	Free	%		Initial

Figure 6. Game Bookkeeping Log Form

SECTION 5
BUILT IN DIAGNOSTICS

The built in diagnostics were designed for ease of operation and thoroughness. The diagnostics are organized in such a way as to allow individual testing of different areas in the machine. These include:

a) CPU Board Self-Tests
b) Game Status change
c) Display Digits test*
d) Lamps (test 1)
e) Solenoids (test 2)*
f) Switches (test 3)*
g) Game Status display (test 4)*

*There are specific sub-tests in these tests.

There is also an auto cycle test which will be discussed later.

Diagnostic Switches

There are three switches which are used to control the operation of the diagnostics:

1. Diagnostic Start switch (lower pushbutton on CPU)
2. Auto/Manual switch (inside coin door)
3. Advance pushbutton (inside coin door)

Pressing the Diagnostic Start switch on the CPU Board initiates the diagnostics and causes the CPU to perform three self tests automatically:

1. ROM/PROM Test
2. RAM Test
3. CMOS RAM Test

If any errors are detected, the two LEDs on the CPU Board will light to indicate the specific failure. If all three tests pass successfully, the two LEDs will blink twice slowly and then go off. The diagnostics will then be a GAME STATUS CHANGE.

Sound Board Diagnostics

The Sound Board Self-Test exercises Sound Board circuitry and causes a continuous sound to be emitted. This sound can be used for checking amplifier circuitry and for adjusting the volume. Proceed as follows:

1. Perform CPU Board Self-Tests.
2. Momentarily depress the diagnostic pushbutton on the Sound Board.
3. If no sound is produced check the setting of the volume control and the power and speaker connections to the Sound Board. Also check that the jumper connector 10P4 is in place. If this does not resolve the problem or if a sound is produced from the self-test, refer to Table 12 in the troubleshooting charts that follow.

CPU Board Self Tests

1. Open the coin door.
2. With the game turned ON, locate the DIAGNOSTIC pushbutton on the right side of the CPU board.
3. Momentarily depress the DIAGNOSTIC pushbutton. The LEDs should blink twice and all displays should go blank.
4. For the following indications of the LEDs, proceed as follows:

Indicates ROM/PROM failure; one or more of IC17, IC20, IC21, IC22, and IC26 are faulty. Isolate the faulty chip(s) by substitution.

Indicates RAM failure (IC13 or IC16), replace the CPU Board.

Indicates CMOS RAM (IC19) or PIAI (IC18) failure. Replace the CPU Board.

5. If the LEDs come on and stay on when the game if first turned ON or the LEDs remain off when the DIAGNOSTIC pushbutton is depressed, refer to Table 11 in the troubleshooting charts that follow.

Game Status Change

Following the successful completion of the CPU Board self tests, the two LEDs blink twice slowly and the diagnostic program enters the game status change section. **This is the only time** that changes can be entered as outlined in the game adjustments section of this manual. Any changes made to the game features will not be displayed until the game status display (test 4) described later. After making all game status changes (if any), press the coin door ADVANCE pushbutton once to go to the display digits test.

NOTE:

This section of the diagnostics is the only time that ALL player and master display digits are blank or turned OFF. No digits show on the displays until the next section of the diagnostics is entered. If there are **any** displayed, you are not in the GAME STATUS CHANGE portion of the diagnostics and any changes that are entered are ignored.

Display Digits Test

This test is controlled by the two switches mounted on the coin door. If the AUTO/MANUAL switch is set to AUTO, the digits on the display will alternate from 0 to 1 etc. to 9 and back to 0, 1, etc. This will continue until the ADVANCE position is pressed.

If the AUTO/MANUAL switch is set to MANUAL when entering the test, the digit displays will show all zeros and will remain at zero until the ADVANCE is pressed. This will change all the displays to all 1s. Pressing ADVANCE again will change the display to all 2s, etc.

Each time the ADVANCE pushbutton is pressed the digits will change. Setting the AUTO/MANUAL switch to AUTO will cause the digits to start cycling automatically. To regain manual control, set the AUTO/MANUAL switch to MANUAL and press the ADVANCE pushbutton. To exit this test and proceed to the LAMP Test (Test 1), set the AUTO/MANUAL switch to AUTO and press the ADVANCE pushbutton once. All the displays will clear. The number of players digit will display 1 to indicate test 1 and the diagnostic will go to the lamp test.

LAMP TEST-TEST 1

This test causes all multiplexed lamps to blink on and off. The AUTO/MANUAL switch has no effect in this test. All

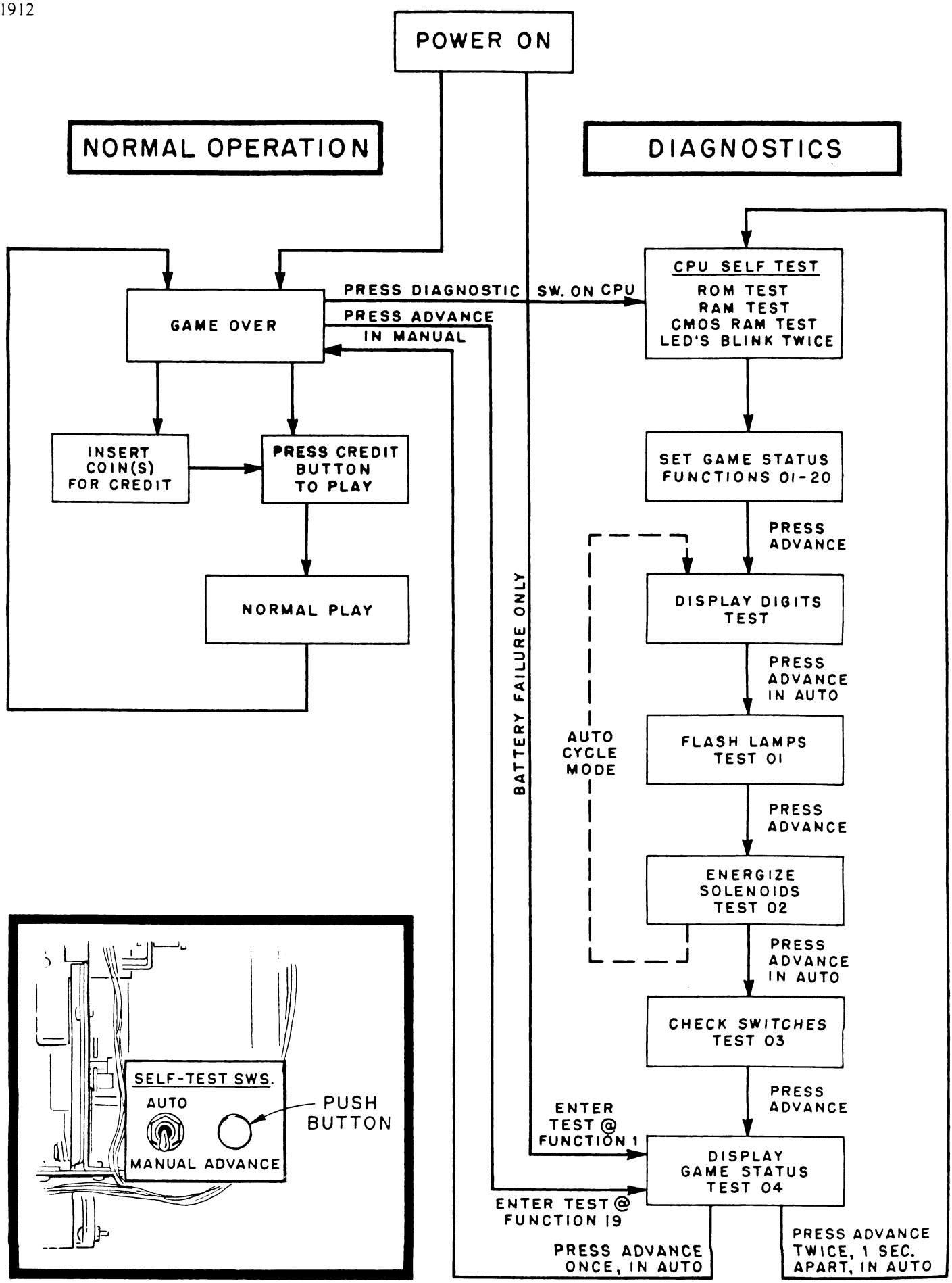


Figure 7. Normal Operation and Diagnostic Flow Chart

lamps will continue to blink until the ADVANCE pushbutton is pressed. This causes the diagnostic to proceed directly to the Solenoid Test (Test 2). Note that the general illumination lamps do not blink on and off during this or at any other time.

SOLENOID TEST-TEST 2

When this test is entered, the number of players digit will display 2 to indicate test 2. This test is controlled by the AUTO/MANUAL switch and the ADVANCE pushbutton.

This test is designed to activate each solenoid. The frame counter will indicate the number of the solenoid being activated. Refer to Chart 3 for the solenoid identification list. Note that in the shuffle alley the solenoids numbered 18 thru 22 are not used.

If the AUTO/MANUAL switch is in the AUTO position when this test is entered, the test will automatically sequence from solenoid 01 to 02 to 03 etc. to 22 and back to 01, 02, 03, etc. Note that pin crash sounds should be produced with each pulsing of solenoids 1 - 10. This will continue until either the ADVANCE pushbutton is pressed to go on to the next test or the AUTO/MANUAL switch placed to the MANUAL position and the ADVANCE pushbutton pressed, causing the test to cycle only the solenoid where the pause occurred.

If the AUTO/MANUAL switch is in the MANUAL position when the test is entered, the test will operate solenoid 01 repeatedly until the ADVANCE pushbutton is pressed. then the solenoid 02 will be operated repeatedly until the ADVANCE pushbutton is again pressed. Placing the AUTO MANUAL switch to the AUTO position at any time will cause automatic sequencing to resume. When the ADVANCE pushbutton is pressed with the AUTO/MANUAL switch in the AUTO position, the diagnostics will advance to the SWITCH TEST.

CHART 3
SHUFFLE ALLEY Solenoid List

01	Pin 1	08	Pin 8	16	Sound
02	Pin 2	09	Pin 9	17	Coin Lockout
03	Pin 3	10	Pin 10	18	Not Used
04	Pin 4	11	Reset Pins	19	Not Used
05	Pin 5	12	Not Used	20	Not Used
06	Pin 6	13	Sound	21	Not Used
07	Pin 7	14	Sound	22	Not Used
		15	Sound		

SWITCH TEST-TEST 3

When this test is entered the number of players digit will display 3 to indicate test 3. The position of the AUTO MANUAL switch has no effect on the operation of this test. After entering this test, the frame counter display will display up to four switches on the playfield that are closed or stuck. After this listing is complete only the last switch closed will be indicated. If no switch is closed when this test is entered the display will be blank.

All switches can be checked by closing the switches manually and observing that the switch number appears in the credit display. To exit this section of the diagnostics, press the ADVANCE pushbutton to go to the display game status test 4.

Refer to Figure 8 for the description and location of all switches in the shuffle alley.

DISPLAY GAME STATUS-TEST 4

When this test is entered, the number of players digit will display 4 to indicate test 4. This test displays on Player 1 display the current game status for the 20 functions that can be changed according to section 3 in this manual and for the bookkeeping totals which can be accessed as described in Section 4. Changes to the game status CANNOT be made at this time! To make changes the diagnostics must be in the Game Status Change section of the diagnostics as previously explained.

When this test is entered, if the AUTO/MANUAL switch is in the AUTO position the test will sequentially display the game status data values on the Player 1 display and the function number on the frame counter display and continue cycling until the ADVANCE pushbutton is pressed. If the ADVANCE pushbutton is pressed once, the diagnostics will end and the game will go to the GAME OVER mode. If the ADVANCE pushbutton is pressed once and then after a 1 second pause pressed a second time, the diagnostics will start all over again with the CPU Self Tests and then go to Game Status Change section of the diagnostics.

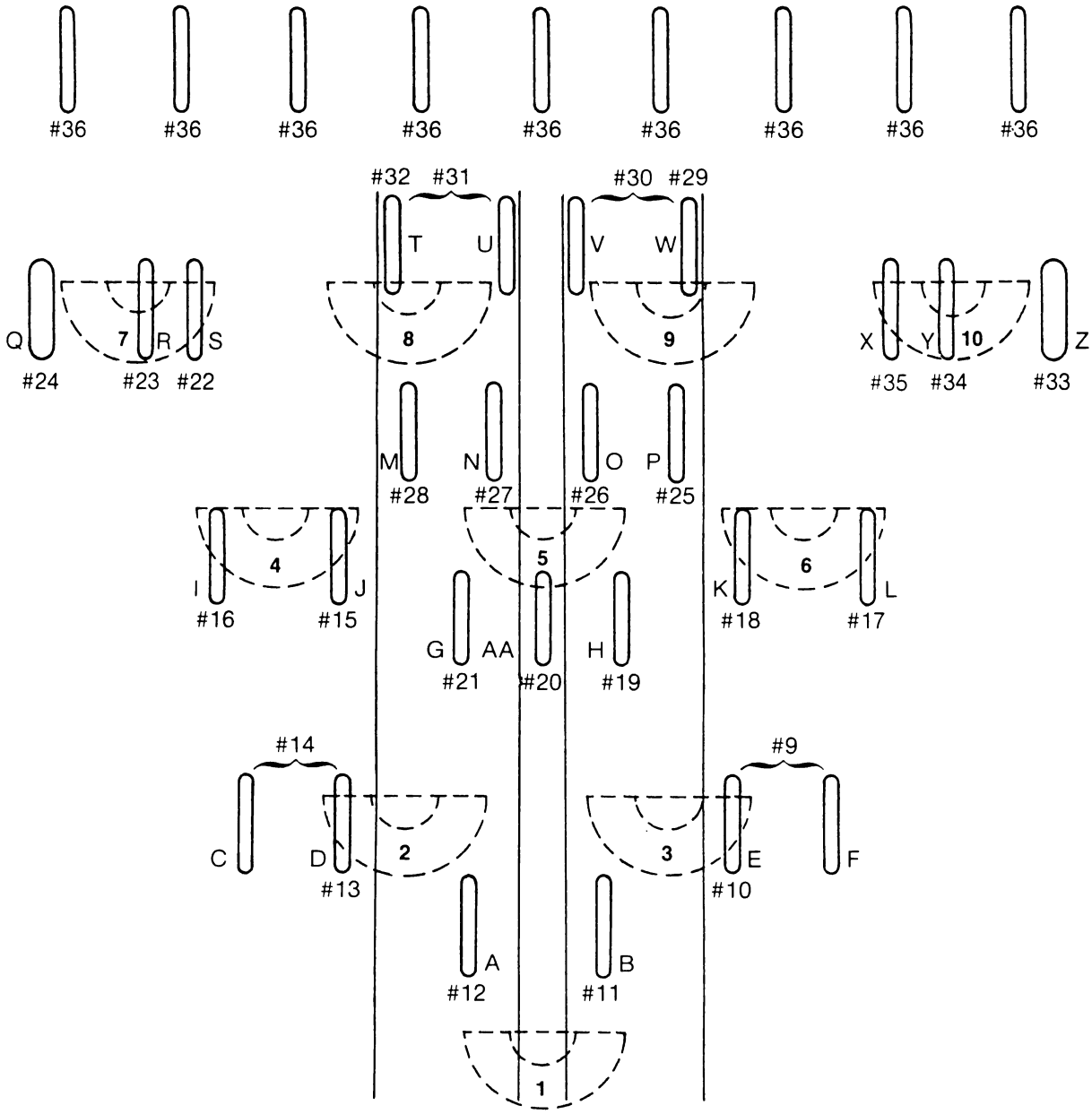
If the AUTO/MANUAL switch is in the MANUAL position when the test is entered, the display will show 01, Player 1 display the value of whatever is function 01, and will remain that way until the ADVANCE pushbutton is pressed, at which time the value for function 02 will display on Player 1 display and 02 will display in the frame counter display. Each time the ADVANCE pushbutton is pressed, the frame counter display will increment by 1 until 28 is reached, then it will return to 01. This will continue until the AUTO/MANUAL switch is returned to the AUTO position and the ADVANCE pushbutton pressed once or twice as described above. Refer to Table 1 for an explanation of the values read out during this test.

AUTO CYCLE MODE

As an aid in diagnosing intermittent problems or as a means to let the machine cycle itself through portions of the diagnostics, provision was made for the AUTO CYCLE MODE. This mode will sequence through the digit display test, go to test 1 and flash the lamps 128 times then go to test 2 and energize each solenoid then digit test, test 1, etc. This can be allowed to run indefinitely or until the ADVANCE pushbutton is pressed to regain control of the diagnostics.

To enter the AUTO CYCLE MODE:

1. Turn game OFF then turn game ON.
2. Press the diagnostic pushbutton on the CPU Board to enter diagnostics.
3. Set the data and function switches as follows:
   DATA SWITCH (TOP SWITCH)—Turn all switches OFF.
   FUNCTION SWITCH (BOTTOM SWITCH)—Turn all switches OFF then turn ON only switch 1.
4. Press the ENTER pushbutton on the CPU Board. The two LEDs will blink to accept the data.
5. Set the AUTO/MANUAL switch to AUTO.
6. Press ADVANCE pushbutton ONCE. The AUTO CYCLE MODE will begin and continue until the ADVANCE pushbutton is pushed again to regain manual control of the diagnostics or the machine is turned OFF.



SWITCH NO.	FUNCTION	LOCATION
1	Select Game	Coin Cabinet
2	Credit Button	Coin Cabinet
3	Right Coin Slot	Coin Door
4	Center Coin Slot	Coin Door
5	Left Coin Slot	Coin Door
6	Anti-Slam	Coin Door
7	High Game Reset	Coin Cabinet
8	Not Used	—
9-36	Pin Rollovers	Play Field

Figure 8. Location of Playfield Switches

SECTION 6
TROUBLESHOOTING CHARTS

Tables 3 through 12 are used in conjunction with the diagnostic test described in Section 5 to isolate problems and repair faulty games. For specific problems with:

Lamps—See Table 3
Switches—See Table 4
Solenoids—See Table 5
Master Display—See Table 6
Player Display—See Table 7
Game Operation—See Table 8
Losing memory—See Table 9
Game does not operate or blows fuses—See Table 10
No response to CPU Self-Tests or intermittent operation See Table 11
Sound—See Table 12

Table 3. Lamps
(Place Diagnostics in Test 01)

1 LAMP	4-8 LAMPS	ALL LAMPS	GENERAL ILLUMI.
Always OFF 1. Check Bulb 2. Check Diode (Observe Polarity) 3. Check wiring (broken wires) **Glows DIM** 1. Check Bulb (correct #bulb) 2. Check Diode (Observe Polarity) 3. Check wiring (shorted wires) **Always ON** 1. Check Diode (Observe Polarity) 2. Check wiring (shorted wires)	**Always OFF** 1. Check wiring (broken wires) 2. Check Connectors (2J5, 2J7) 3. Replace Driver Board **Glows DIM** 1. Check wiring (broken wires) 2. Check Diode 3. Check Connectors (2J5, 2J7) 4. Replace Driver Board **Always ON** 1. Check wiring (shorted wires) 2. Check Diodes 3. Check Connectors (2J5, 2J7) 4. Replace Driver Board	**Always OFF** 1. Check fuse 3F3 on Power Supply 2. Check for +18 VDC on fuse 3F3 to ground 3. Check Connector 3J4 4. Check Connector 8P2/8J2 5. Check wiring (broken or shorts) 6. Replace Driver Board **Glows DIM** 1. Check line voltage 2. Check for +18 VDC on fuse 3F3 to ground	**Always ON** Normal Condition **Always OFF** 1. Check Fuse 3F4 on Power Supply 2. Check for +6.3 VAC 3. Check Connectors (3J3) 4. Check Connectors 9P1 and 8P2/8J2 5. Check wiring (broken or short) **Glows DIM** 1. Check line voltage
All lamps are N44 or equivalent All diodes are 1N4001 or equivalent			

Table 4. Switches
(Place Diagnostics in Test 03)

1 SWITCH	4-8 SWITCHES		ALL SWITCHES
Always Actuated 1. Check contacts 2. Check shorted wires **Never Actuates** 1. Check adjustment 2. Check broken wires 3. Check for open diode by jumpering across diode and actuating.	**Always Actuated** 1. Check adjustments 2. Check shorted wires on playfield or to 2J2, 2J3 3. Replace Driver Board **Never Actuated** 1. Check adjustment 2. Check broken wires on playfield or 2J2, 2J3 3. Check plug 8P1/8J1 for broken wires or pushed out pins 4. Replace Driver Board	**Switch Closure Displays Multiple Switch Numbers** 1. Check adjustments 2. Check shorted wires on playfield or to 2J2, 2J3 3. Replace Driver Board **Switch Displays Incorrect No.** 1. Check correct switch chart for game and check adjustment 2. Incorrect wiring on playfield 2J2, 2J3, or 8P1/8J1 3. Check Connector keying	1. Check adjustments 2. Check Connectors 2J2, 2J3, are not exchanged 3. Replace Driver Board

Table 5. Solenoids
(Place Diagnostics in Test 02)

1 SOLENOID		ALL SOLENOIDS
Never Actuates 1. Check solenoid Chart to verify number correct and in use 2. Broken wire to solenoid 3. Shorted diode across solenoid 4. Shorted/burned out solenoid 5. Open driver for that solenoid—replace Driver Board	**Always Actuated** 1. Shorted wire for that solenoid 2. Shorted driver for that solenoid on Driver Board—replace Driver Board	**Never Actuated** 1. Check for +28 VDC on Power Supply fuse 3F2 to ground 2. Check fuse 3F2 on Power Supply 3. Check Connectors 3J3 and 3J4 on Power Supply 4. Check Connector 2J9, 2J10, 2J11, 2J12 for broken/shorted wires. 5. Replace Driver Board

Table 6. Master Display
(Place Diagnostics in Display Digits Test)

USE EXTREME CAUTION WHEN MEASURING HIGH VOLTAGES!!!	
NO DISPLAY	INCORRECT DISPLAY
1. Check -100 VDC, +100 VDC & fuse 3F1 on Power Supply. 2. Check connectors 3J5, 4J7, 4J5, 1J3, 1J5, 1J6, 1J7 3. Check for +100 VDC and -100 VDC on connector 4J7—replace Power Supply Board if voltage incorrect 4. Replace Master Display Board.	1. Check +100 VDC, -100 VDC at 4J7 2. Check for broken or shorted wires on 4J5, 4J6, 1J5, 1J6, 1J7 3. Replace Master Display Board

Table 7. Player Display
(Place Diagnostics in Display Digits Test)

USE EXTREME CAUTION WHEN MEASURING HIGH VOLTAGES!!!	
1 PLAYER DISPLAY INCORRECT/OFF	2-6 PLAYER DISPLAYS INCORRECT/OFF
1. Check correct location of connector from Master Display Board. 2. Replace Player Display—if still incorrect, replace Master Display Board.	1. Check correct location of connectors from Master Display Board 2. Check voltage +100 VDC and -100 VDC on connector 4J7 3. If voltages are correct—replace Master Display Board.

Table 8. Game Operation

GAME OPERATION
1. Play game manually to verify problem. 2. Review Section 2, Game Operation. 3. Place in Diagnostics Test 04; review and change game adjustments to that desired.

Table 9. Losing Memory

GAME COMES UP IN TEST 04 WHEN TURNED ON	GAME GOES TO DIAGNOSTICS FROM GAME OVER OR DURING PLAY
1. Check that the batteries are properly seated. 2. Turn game OFF and wait 30 seconds. 3. Check battery voltage from the anode of 1D17 to ground. If less than 3.9 VDC, replace the batteries. 4. Check battery voltage from cathode of 1D17 to ground. If less than 3.2 VDC, replace diode and recheck voltage. 5. Replace CPU Board.	Perform procedures for intermittent operation provided in Table 11.

Table 10. Inoperative or Blows Fuses

MACHINE INOPERATIVE

1. Remove plug from wall outlet and measure wall voltage.
2. With machine unplugged, check the line fuse, line cord, and ON/OFF switch with an Ohmmeter for continuity.
3. Check for any loose connections on line filter, ON/OFF switch.
4. Check that power connector to transformer is securely connected.
5. Check all fuses on power supply board.
6. Plug machine in, turn on and check voltage on power supply board fuses.

MACHINE BLOWS FUSE

Wall Fuse or Circuit Breaker Fuse

1. Disconnect wall plug.
2. Disconnect connector from line filter to transformer.
3. Check line cord with Ohmmeter for shorts.
4. Check varistor and line filter for shorts.
5. Plug cord in wall and see if wall fuse still blows - if yes, disconnect whatever else is on same wall plug circuit and repeat steps 3 and 4 above.

Machine Fuse

1. Check for correct fuse rating.
2. Check varistor, line filter, line cord for shorts.
3. Disconnect connector from line filter to transformer and try another fuse.
4. If fuse still blows, repeat steps 1-3.
5. If fuse does not blow, disconnect 3P1 and 3P2 plugs from the power supply board and reconnect plug from line filter to transformer.
6. If fuse blows, check transformer and both lamps and solenoid rectifiers for shorts.
7. If fuse does not blow, plug in 3P2 and 3P1 then try again. If fuse now blows, disconnect 3P3, 3P4, 3P5, 3P6, and try another fuse. If fuse still blows replace Power Supply.
8. If fuse doesn't blow, hook up 3P3, 3P4, 3P5, and 3P6 one at a time. If fuse blows when any one is plugged, look for burned out solenoid, dead shorts, etc.

Individual Power Supply Fuse

1. Disconnect load from portion of the power supply that blows the fuse by disconnecting the appropriate plug.
   a. 3F1 (+100 VDC, -100 VDC) disconnect 3P5
   b. 3F2 (+28 VDC) disconnect 3P4, 3P3
   c. 3F3 (+18 VDC) disconnect 3P4
   d. 3F4 (6.3 VAC) disconnect 7P1, 8P2
   e. 3F5, 6F2, 11 6F3 (+5 VDC) disconnect 3P6
2. If fuse still blows, replace Power Supply.
3. If fuse does not blow, check for shorts in wiring, burned out solenoids, etc.

Table 11. No Response to CPU Self-Test or Intermittent Operation

LEDs REMAIN ON AFTER POWER TURN-ON	LEDs DO NOT FLASH AND REMAIN OFF WHEN DIAGNOSTIC SWITCH DEPRESSED	INTERMITTENT OPERATION
1. Check +5 VDC and Unregulated Logic B+ on CPU and Power Supply Boards. (See Table 4.) If low: a. Check ac input from transformer. b. Check wiring from transformer to 3P1-10, -11, and -12. c. Check 3D6 and 3D7. d. Replace Power Supply Board. 2. Turn game OFF and completely remove Driver Board from the backbox. Reapply power and depress the DIAGNOSTIC push-button on the CPU Board. If the LEDs blink twice and then remain OFF, replace the Driver Board. Otherwise, replace the CPU Board.	1. Turn game OFF and back ON. 2. If problems persist, check +5 VDC from power supply. If ok, replace CPU Board.	1. Make checks described in step 1 for LEDs remaining on after power turn-on. 2. Replace CPU Board.

Table 12. Sound Problems
(Place Diagnostics in Test 02)

1 OR MORE SOUNDS	ALL SOUNDS
1. Broken wire to 10J3 connector. 2. Replace PROM on Sound Board. 3. Open driver on Driver Board; replace driver on Driver Board. 4. Open Buffer on Sound Board; replace buffer on Sound Board. 5. Replace Sound Board	**Never Sound** 1. Check fuses 10F1 and 10F2 on Sound Board and 7F2 adjacent to Sound Board. 2. Check connectors 10J1, 10J2, 10J3 and 10J4. 3. Check volume control position. 4. Check amplifier portion of Sound Board. 5. Replace PROM on Sound Board. 6. Remove connector 10P3 and momentarily ground one of the used input pins of 10J3. If a sound is produced, a solenoid driver transistor is stuck on. Repair or replace Driver Board. 7. Replace Sound Board.

SECTION 7
INTERCONNECTION CHARTS

The following interconnection charts are used to identify the color and pin number of all the wires for all the components and typical wiring sketches for each type of circuit.

The following conventions are used throughout—

1. 1J1 is connector J1 on board 1.
   3J6 is connector J6 on board 3.
2. J designations refer to the male part of plug.
   P designations refer to the female part of plug.
3. The prefix numbers are as follows:
   1. CPU Board
   2. Driver Board
   3. Power Supply Board
   4. Master Display Board
   5. Slave Display Board
   6. Back Box Miscellaneous
   7. Coin-Box
   8. Playfield & Pin Panel
   9. Insert Door
   10. Sound Board
   11. Sound Converter Board

Refer to Figures 9, 10, 11 and 12 for solenoid assignments, lamp matrix, the switch matrix, and connector identification, respectively.

SOLENOIDS

GRY-BRN	GRY-RED	GRY-ORN	GRY-YEL	GRY-GRN	GRY-BLU	GRY-VIO	GRY-BLK
PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
B-28-1450	B-28-1450	B-28-1450	B-28-1450	B-28-1450	B-28-1450	B-28-1450	B-28-1450
01	02	03	04	05	06	07	08

BRN-BLK	BRN-RED	BRN-ORN	BRN-YEL	BRN-GRN	BRN-BLU	BRN-VIO	BRN-GRY
PIN 9	PIN 10	PIN RESET	NOT USED	SOUND	SOUND	SOUND	SOUND
B-28-1450	B-28-1450	Z-31-2000		(SEE NOTE)	(SEE NOTE)	(SEE NOTE)	(SEE NOTE)
09	10	11	12	13	14	15	16

SPECIAL SOLENOIDS

BLU-BRN	
COIN LOCK-OUT M-35-4000	NOT USED
17	18-22

NOTE: Sounds are produced by solenoids 13 through 16 as follows:

Sound	Solenoid	Sound	Solenoids
Tone 1 (lowest)	13	Spare	13 and 16
Tone 2	14	Slam switch and red strike in 800 and Advance	14 and 16
Tone 3	13 and 14	Game Select	13, 14 and 16
Tone 4 (highest)	15	Game Start	15 and 16
Strike and Coin switch	16	*Blown Frame	13, 15 and 16
		*Sound Board Toggle switch must also be set to proper position	

Pin crash sound is produced by any one of solenoids 1 through 10.

Figure 9. Shuffle Alley Solenoid Chart

COLUMN / ROW	1 YEL-BRN	2 YEL-RED	3 YEL-ORN	4 YEL-BLK	5 YEL-GRN	6 YEL-BLU	7 YEL-VIO	8 YEL-GRY
1 RED-BRN	RIGHT 100 FIELD	RIGHT 500 FIELD (RED)	LEFT 100 HOOD	RIGHT 100 HOOD	PLAYER 1 SPARE	PLAYER 3 SPARE	PLAYER 6 SPARE	GAME 2
2 RED-BLK	RIGHT 200 FIELD	CREDIT LAMP	LEFT 200 HOOD	BOWL AGAIN	PLAYER 1 STRIKE 2	PLAYER 3 STRIKE 2	PLAYER 6 STRIKE 2	GAME 4
3 RED-ORN	RIGHT 300 FIELD	LEFT 500 FIELD (RED)	LEFT 300 HOOD	SPARE 10TH FRAME	PLAYER 1 STRIKE 1	PLAYER 3 STRIKE 1	PLAYER 6 STRIKE 1	GAME 5
4 RED-YEL	RIGHT 400 FIELD	PYRAMID "P"	LEFT 400 HOOD	STRIKE 2 10TH FRAME	PLAYER 1 UP	PLAYER 3 UP	PLAYER 6 UP	GAME 1 REGULA-TION
5 RED-GRN	LEFT 400 FIELD	PYRAMID STRIKE 3	500 HOOD	STRIKE 1 10TH FRAME	PLAYER 4 SPARE	PLAYER 2 SPARE	PLAYER 5 SPARE	GAME 3
6 RED-BLU	LEFT 300 FIELD	PYRAMID STRIKE 2	RIGHT 400 HOOD	10TH FRAME	PLAYER 4 STRIKE 2	PLAYER 2 STRIKE 2	PLAYER 5 STRIKE 2	BEER FRAME
7 RED-VIO	LEFT 200 FIELD	PYRAMID STRIKE 1	RIGHT 300 HOOD	GAME OVER	PLAYER 4 STRIKE 1	PLAYER 2 STRIKE 1	PLAYER 5 STRIKE 1	HIGH SCORE TO DATE
8 RED-GRY	LEFT 100 FIELD	NOT USED	RIGHT 200 HOOD	NOT USED	PLAYER 4 UP	PLAYER 2 UP	PLAYER 5 UP	NOT USED

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Figure 10. Light Matrix

ROW \ COLUMN		1 GRN-BRN	2 GRN-RED	3 GRN-ORN	4 GRN-YEL	5 GRN-BLK
1	WHT-BRN	SELECT GAME 1	PLAYFIELD E AND F (SERIES) 9	PLAYFIELD L 17	PLAYFIELD P 25	PLAYFIELD Z 33
2	WHT-RED	CREDIT BUTTON 2	PLAYFIELD E 10	PLAYFIELD K 18	PLAYFIELD O 26	PLAYFIELD Y 34
3	WHT-ORN	RIGHT COIN SLOT 3	PLAYFIELD B 11	PLAYFIELD H 19	PLAYFIELD N 27	PLAYFIELD X 35
4	WHT-YEL	CENTER COIN SLOT 4	PLAYFIELD A 12	PLAYFIELD AA 20	PLAYFIELD M 28	PLAYFIELD BACK ROW 36
5	WHT-GRN	LEFT COIN SLOT 5	PLAYFIELD D 13	PLAYFIELD G 21	PLAYFIELD W 29	NOT USED 37
6	WHT-BLU	ANTI SLAM 6	PLAYFIELD C AND D (SERIES) 14	PLAYFIELD S 22	PLAYFIELD V AND W (SERIES) 30	NOT USED 38
7	WHT-VIO	HIGH GAME RESET 7	PLAYFIELD J 15	PLAYFIELD R 23	PLAYFIELD T AND U (SERIES) 31	NOT USED 39
8	WHT-GRY	NOT USED 8	PLAYFIELD I 16	PLAYFIELD Q 24	PLAYFIELD T 32	NOT USED 40

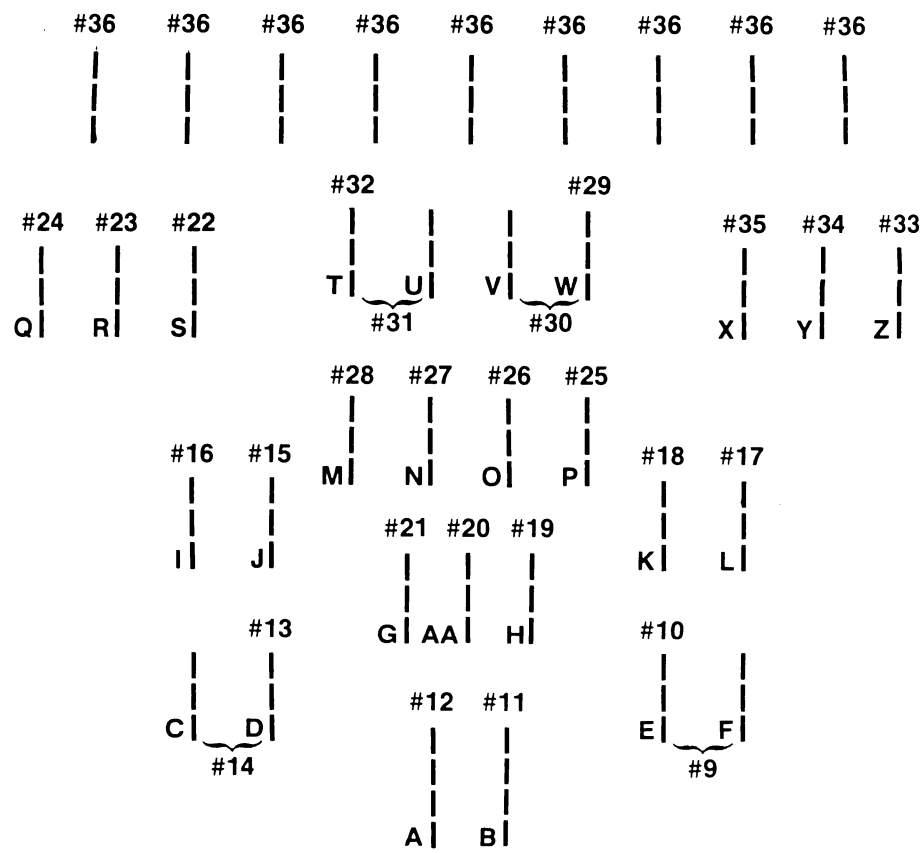

Figure 11. Shuffle Alley Switch Matrix and Playfield Switch Locations

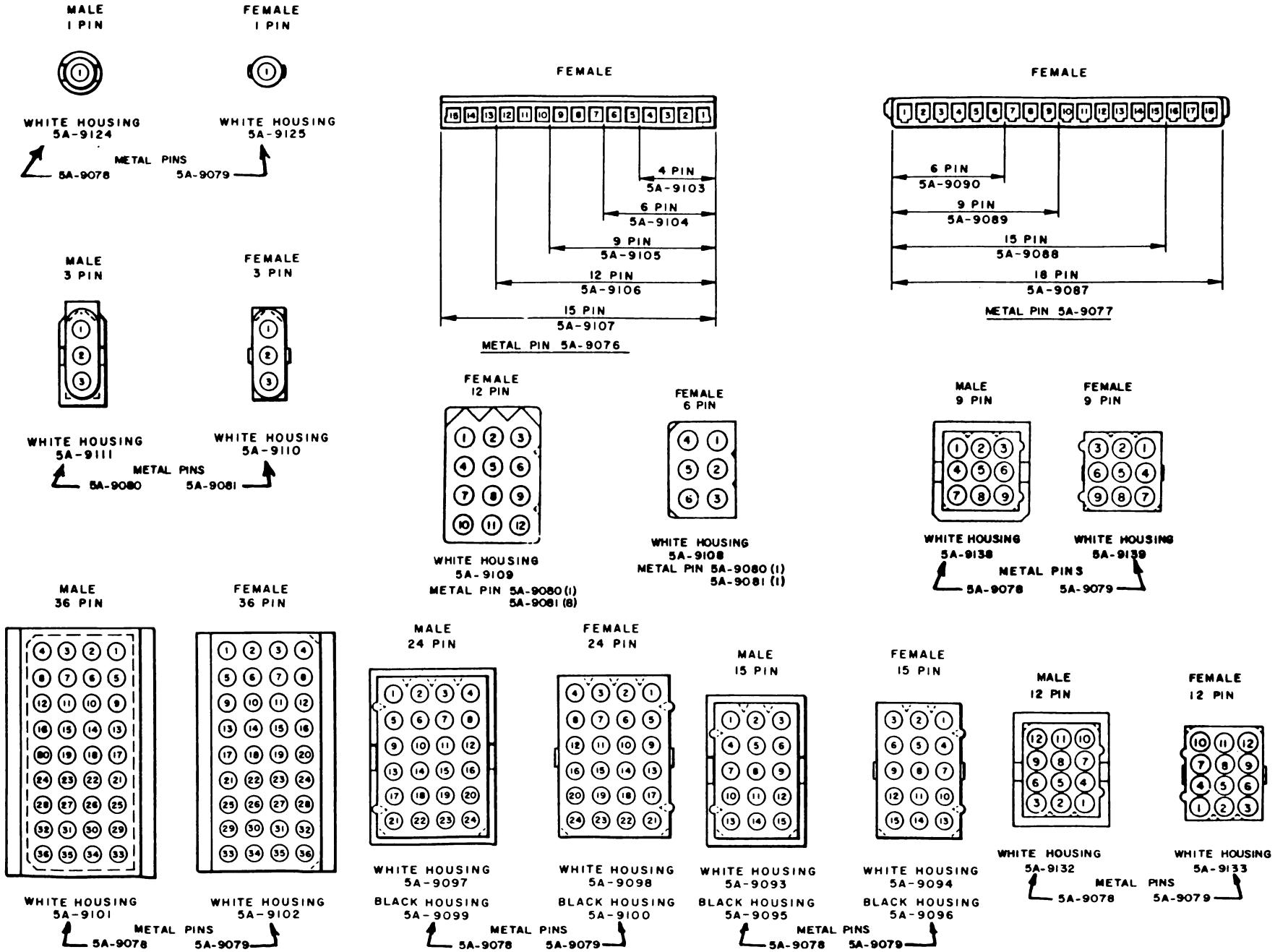

Figure 12. Connector Details

CPU BOARD

Pin	Wire Color	Function
1J1 - INTERBOARD CONNECTOR		
1P2 - LOGIC POWER BUS INPUT		
1	Black	Logic Ground
2	Black	Logic Ground
3	Black	Logic Ground
4	Gray	Logic B+ (+5 VDC)
5	Gray	Logic B+ (+5VDC)
6	Gray	Logic B+ (+5VDC)
7	Key	Key
8	N/C	Not Used
9	Gray-White	Logic B+ (+12V) (Unregulated)
1P3 - DISPLAY BLANKING		
1	N/C	Not Used
2	N/C	Not Used
3	Key	Key
4	Blue-White	Display Blanking
1P4 - DIAGNOSTIC SWITCH INPUTS		
1	Key	Key
2	White	Diagnostic Common
3	Green	Diagnostic Advance
4	Blue	Diagnostic Auto/Man.
1P5 - MASTER DISPLAY BCD OUTPUTS		
1	Blue-Yellow	Display BCD D1
2	Blue-Orange	Display BCD C1
3	Blue-Red	Display BCD B1
4	Blue-Brown	Display BCD A1
5	Blue-Gray	Display BCD D2
6	Key	Key
7	Blue-Violet	Display BCD C2
8	Blue-Black	Display BCD B2
9	Blue-Green	Display BCD A2
1P6 - MASTER DISPLAY STROBE OUTPUTS		
1	Violet-Gray	Display Strobe #16
2	Violet-Black	Display Strobe #15
3	Violet-Blue	Display Strobe #14
4	Violet-Green	Display Strobe #13
5	Violet-Yellow	Display Strobe #12
6	Violet-Orange	Display Strobe #11
7	Key	Key
8	Violet-Red	Display Strobe #10
9	Villet-Brown	Display Strobe #9
1P7 - MASTER DISPLAY STROBE OUTPUTS		
1	Brown-Gray	Display Strobe #8
2	Brown-Violet	Display Strobe #7
3	Brown-Blue	Display Strobe #6
4	Brown-Green	Display Strobe #5
5	Brown-Yellow	Display Strobe #4
6	Brown-Orange	Display Strobe #3
7	Brown-Red	Display Strobe #2
8	Key	Key
9	Brown-Black	Display Strobe #1

DRIVER BOARD

Pin	Wire Color	Function
2P1 - INTERBOARD CONNECTOR		
2P2 - SWITCH STROBE DRIVE		
1	N/C	Not used
2	N/C	Not Used
3	N/C	Not Used
4	Key	Key
5	Green-Black	Switch Strobe #5
6	Green-Yellow	Switch Strobe #4
7	Green-Orange	Switch Strobe #3
8	Green-Red	Switch Strobe #2
9	Green-Brown	Switch Strobe #1
2P3 - SWITCH ROW INPUTS		
1	White-Gray	Switch Return #8
2	Key	Key
3	White-Violet	Switch Return #7
4	White-Blue	Switch Return #6
5	White-Green	Switch Return #5
6	White-Yellow	Switch Return #4
7	White-Orange	Switch Return #3
8	White-Red	Switch Return #2
9	White-Brown	Switch Return #1
2P4 - LAMP POWER BUS		
1	Blue	Lamp B+
2	Blue	Lamp B+
3	Key	Key
4	Blue	Lamp B+
5	Blue	Lamp B+
6	N/C	Not Used
7	Blue	Lamp B+
8	Blue	Lamp B+
9	Blue	Lamp B+
2P5 - LAMP COLUMN DRIVE		
1	Yellow-Violet	Lamp Column #7
2	Yellow-Gray	Lamp Column #8
3	Yellow-Green	Lamp Column #5
4	Key	Key
5	Yellow-Blue	Lamp Column #6
6	Yellow-Orange	Lamp Column #3
7	Yellow-Black	Lamp Column #4
8	Yellow-Brown	Lamp Column #1
9	Yellow-Red	Lamp Column #2
2P6 - LAMP GROUNDS		
1	Black	Lamp Ground
2	Key	Key
3	Black	Lamp Ground
4	Black	Lamp Ground
5	N/C	Not Used
6	Black	Lamp Ground
7	Black	Lamp Ground
8	Black	Lamp Ground
9	Black	Lamp Ground

DRIVER BOARD (Cont.)

Pin	Wire Color	Function
2P7 - LAMP ROW DRIVE		
1	Red-Brown	Lamp Row #1
2	Red-Black	Lamp Row #2
3	Red-Orange	Lamp Row #3
4	Red-Yellow	Lamp Row #4
5	Red-Green	Lamp Row #5
6	Red-Blue	Lamp Row #6
7	Key	Key
8	Red-Gray	Lamp Row #8
9	Red-Violet	Lamp Row #7
2P8 - LOGIC POWER BUS INPUT		
1	Black	Logic Ground
2	Black	Logic Ground
3	Black	Logic Ground
4	Black	Logic Ground
5	Key	Key
6	Gray	Logic B+ (+5VDC)
7	Gray	Logic B+ (+5VDC)
8	Gray	Logic B+ (+5VDC)
9	Gray	Logic B+ (+5VDC)
2P9 - SOLENOID DRIVE		
1	Brown-Orange	Coil #11 Pin Reset
2	N/C	Not Used
3	Brown-Green	Coil #13 Sound
4	Brown-Blue	Coil #14 Sound
5	Brown-Violet	Coil #15 Sound
6	Brown-Gray	Coil #16 Sound
7	Brown-Red	Coil #10 10 Pin
8	Key	Key
9	Brown-Black	Coil #9 9 Pin
2P10 - SOLENOID GROUNDS		
1	Black	Solenoid Ground
2	Black	Solenoid Ground
3	Black	Solenoid Ground
4	Black	Solenoid Ground
5	Key	Key
6	N/C	Not Used
7	Black	Solenoid Ground
8	Black	Solenoid Ground
9	Black	Solenoid Ground
2P11 - SOLENOID DRIVE		
1	Gray-Black	Coil #8 8 Pin
2	Gray-Violet	Coil #7 7 Pin
3	Gray-Blue	Coil #6 6 Pin
4	Gray-Brown	Coil #1 1 Pin
5	Gray-Red	Coil #2 2 Pin
6	Key	Key
7	Gray-Orange	Coil #3 3 Pin
8	Gray-Yellow	Coil #4 4 Pin
9	Gray-Green	Coil #5 5 Pin
2P12 - SPECIAL SOLENOID DRIVE		
1-4	N/C	Not Used
5	Key	Key
6	N/C	Not Used
7	Blue-Brown	Coin Lockout (Coil 17)
8, 9	N/C	Not Used
2P13 - NOT USED		

POWER SUPPLY

Pin	Wire Color	Function
3P1 - POWER BUS INPUTS		
1	Violet	Lamps (+18VDC)
2	Orange	Solenoids (+28VDC)
3	N/C	Not Used
4	White	90 VAC
5-8	N/C	Not Used
9	White	90 VAC
10	Gray	18.7 VAC
11	Gray	18.7 VAC
12	Gray-White	18.7 VAC C.T.
3P2 - POWER BUS INPUTS		
1,2	N/C	Not Used
3	Black	Solenoid Rect.
4, 5	N/C	Not Used
6	Black	Lamp Rect.
3P3 - DISPLAY LAMPS & SOLENOID POWER BUS		
1	Yellow-White	6.3 VAC
2	Yellow-White	6.3 VAC
3	Black	Ground
4	Yellow	6.3 VAC
5	Yellow	6.3 VAC
6	Red	Solenoid B+ (+28VDC)
7	Red	Solenoid B+ (+28VDC)
8	N/C	Not Used
9	Key	Key
3P4 - LAMP & SOLENOID POWER BUS		
1	Black	Ground
2	Black	Ground
3	Black	Ground
4	Black	Ground
5	Blue	Lamp B+ (+16VDC)
6	Blue	Lamp B+ (+16VDC
7	Blue	Lamp B+ (+16VDC)
8	Blue	Lamp B+ (+16VDC)
9	Black	Ground
10	Black	Ground
11	Black	Ground
12	Black	Ground
3P5 - DISPLAY POWER BUS		
1	Black	Ground
2	N/C	Not Used
3	Orange & Wht-Blk	—100 VDC
4	Brown	+100 VDC
5	Key	Key
6	Gray	Logic B+ (+5 VDC)
3P6 - LOGIC POWER BUS		
1-4	N/C	Not Used
5	Key	Key
6	Gray-White	Logic + (+12V Un-regulated)
7	Gray	Logic B+ (+ 5 VDC)
8	Gray	Logic B+ (+ 5 VDC)
9	Gray	Logic B+ (+ 5 VDC)
10	Gray	Logic B+ (+ 5 VDC)
11	Black	Ground
12	Black	Ground
13	Black	Ground
14	Black	Ground
15	Black	Ground

MASTER DISPLAY

4P1 - MASTER DISPLAY PLAYERS 1 & 2

Pin	Wire Color	Function	
1	Red-Orange	Player 2 100's	
2	Red-Yellow	Player 2 1000's	
3	Brown-Black	Player 1 Unit's	
4	Brown-Red	Play 1 10's	
5	Brown-Orange	Player 1 100's	
6	Key	Key	
7	Brown-Yellow	Player 1 1000's	
8	Brown	Segment a	Player 1
9	Red	Segment b	
10	Blue	Segment f	
11	Violet	Segment g	
12	Orange	Segment c	
13	Green	Segment e	
14	Yellow	Segment d	
15	White-Black	Player 1 Keep Alive	

4P2 - MASTER DISPLAY PLAYERS 2 & 3

Pin	Wire Color	Function	
1	White-Black	Keep Alive Player 3	
2	Orange-Brown	Player 3 Unit's	
3	Orange-Red	Player 3 Ten's	
4	Orange-Black	Player 3 100's	
5	Orange-Yellow	Player 3 1000's	
6	Yellow	Segment d	Players 2 & 3
7	Green	Segment e	
8	Orange	Segment c	
9	Key	Key	
10	Violet	Segment g	Players 2 & 3
11	Blue	Segment f	
12	Red	Segment b	
13	Brown	Segment a	
14	Red-Brown	Player 2 Unit's	
15	Red-Black	Player 2 Ten's	

4P3 - MASTER DISPLAY PLAYERS 4 & 5

Pin	Wire Color	Function	
1	White-Black	Keep Alive Player 4	
2	Yellow-Brown	Player 4 Unit's	
3	Yellow-Red	Player 4 Ten's	
4	Key	Key	
5	Yellow-Orange	Player 4 100's	
6	Yellow-Black	Player 4 1000's	
7	Green-Yellow	Player 5 1000's	
8	Green-Orange	Player 5 100's	
9	Brown	Segment a	Players 4 & 5
10	Red	Segment b	
11	Blue	Segment f	
12	Violet	Segment g	
13	Orange	Segment c	
14	Green	Segment e	
15	Yellow	Segment d	

MASTER DISPLAY (Cont.)

4P4 - MASTER DISPLAY PLAYERS 5 & 6

Pin	Wire Color	Function	
1	Yellow	Segment d	Player 6
2	Green	Segment e	
3	Orange	Segment c	
4	Violet	Segment g	
5	Blue	Segment f	
6	Red	Segment b	
7	Brown	Segment a	
8	Blue-Brown	Player 6 Unit's	
9	Blue-Red	Player 6 Ten's	
10	Blue-Orange	Player 6 100's	
11	Key	Key	
12	Blue-Yellow	Player 6 1000's	
13	Green-Brown	Player 5 Unit's	
14	Green-Red	Player 5 Ten's	
15	White-Black	Keep Alive Player 6	

4P5 - MASTER DISPLAY STROBE INPUTS

1	N/C	Not Used
2	Violet-Gray	Strobe #16
3	Violet-Black	Strobe #15
4	Violet-Green	Strobe #13
5	Violet-Blue	Strobe #14
6	Brown-Black	Strobe #1
7	Brown-Red	Strobe #2
8	Brown-Orange	Strobe #3
9	Brown-Yellow	Strobe #4
10	Brown-Green	Strobe #5
11	Brown-Blue	Strobe #6
12	Brown-Gray	Strobe #8
13	Violet-Brown	Strobe #9
14	Violet-Yellow	Strobe #12
15	Brown-Violet	Strobe #7
16	Violet-Orange	Strobe #11
17	Violet-Red	Strobe #10
18	N/C	Not Used

4P6 - MASTER DISPLAY BCD INPUTS

1	Blue-Red	B1
2	Blue-Orange	C1
3	Blue-White	Blanking
4	Blue-Yellow	D1
5	Blue-Brown	A1
6	Blue-Black	B2
7	Blue-Violet	C2
8	Blue-Gray	D2
9	Blue-Green	A2

4P7 - MASTER DISPLAY POWER INPUTS

1	White-Black	Keep Alive -100VDC
2	Brown	+100VDC
3	Gray	Logic B+ +5VDC
4	N/C	Not Used
5	Black	Ground
6	Orange	-100VDC

PLAYER DISPLAYS

5P1 - PLAYER 1 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	Key	Key
7	Brown-Black	Unit's
8	Brown-Red	Ten's
9	N/C	Not Used
10	Brown-Orange	100's
11	Brown-Yellow	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

5P2 - PLAYER 2 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	Key	Key
7	Red-Brown	Unit
8	Red-Black	Ten's
9	N/C	Not Used
10	Red-Orange	100's
11	Red-Yellow	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

5P3 - PLAYER 3 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	N/C	Key
7	Orange-Brown	Unit's
8	Orange-Red	Ten's
9	N/C	Not Used
10	Orange-Black	100's
11	Orange-Yellow	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

PLAYER DISPLAYS (Cont.)

5P4 - PLAYER 4 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	Key	Key
7	Yellow-Brown	Unit's
8	Yellow-Red	Ten's
9	N/C	Not Used
10	Yellow-Orange	100's
11	Yellow-Black	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

5P5 - PLAYER 5 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	Key	Key
7	Green-Brown	Unit's
8	Green-Red	Ten's
9	N/C	Not Used
10	Green-Orange	100's
11	Green-Yellow	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

5P6 - PLAYER 6 SLAVE DISPLAY

Pin	Wire Color	Function
1	N/C	Not Used
2	Brown	a
3	Red	b
4	N/C	Not Used
5	Orange	c
6	Key	Key
7	Blue-Brown	Unit's
8	Blue-Red	Ten's
9	N/C	Not Used
10	Blue-Orange	100's
11	Blue-Yellow	1000's
12	White-Black	Keep Alive (-100VDC)
13	Yellow	d
14	Brown-White	Keep Alive (+100 VDC)
15	Green	e
16	N/C	Not Used
17	Violet	g
18	Blue	f

BACK BOX MISCELLANEOUS

6P1/6J1-A.C. CABINET CABLE

Pin	Wire Color	Function
1	White-Red	A.C.
2	White-Red	Jumper
	Black	Fluorescent A.C.
3	Brown	A.C.
4	White-Red	Jumper
5	White-Red	Jumper
6	White-Red	Jumper

6P2/6J2-PIN PANEL A.C. CABLE

1	Black	Fluorescent A.C.
2	N/C	Not Used
3	Brown & Grey-White	A.C.
4	White	A.C.

6P3/6J3-TRANSFORMER CABLE

1	Brown & Gray-White	A.C.
2	N/C	Not Used
3	White	A.C.

6P4/6J4-SOLENOID SOUND CABLE

1	N/C	Not Used
2	Brown-Green	Coil #13 Sound
3	Brown-Blue	Coil #14 Sound
4	Brown-Violet	Coil #15 Sound
5	Brown-Gray	Coil #16 Sound
6	N/C	Not Used

6P5/6J5-SOUND BOARD POWER

1	Gray	18.7 VAC
2-4	N/C	Not Used
5	Gray-White	18.7 VAC C.T.
6-8	N/C	Not Used
9	Gray	18.7 VAC

6P6/6J6-SOUND CONVERTER LOGIC POWER

1	N/C	Not Used
2	Gray	Logic B+ (+5VDC)
3	Black	Logic Ground
4	N/C	Not Used

CABINET

7P1/7J1-CABINET SWITCHES AND LAMPS

1	N/C	Not Used
2	Yellow	6.3 VAC Display Lamps
3	Yellow-Red	Lamp Column #2
4	Yellow-White	6.3 VAC Display Lamps
5	N/C	Not Used
6	Red	Solenoid B+
7	Red-Black	Lamp Row #2
8	N/C	Not Used
9	N/C	Not Used
10	N/C	Not Used
11	White-Brown	Switch Row #1
12	White-Red	Switch Row #2
13	White-Orange	Switch Row #3
14	White-Yellow	Switch Row #4
15	White-Green	Switch Row #5
16	White-Blue	Switch Row #6
17	White-Violet	Switch Row #7
18	N/C	Not Used
19	Green	Diagnostic Advance

CABINET (Cont.)

Pin	Color	Function
20	Green-Brown	Switch Column #1
21	N/C	Not Used
22	Blue	Diagnostic Auto & Manual
23	Blue-Brown	Special Solenoid #1
24	White	Diagnostic Common

7P2/7J2-COIN BOX CABLE (WHITE 12 PIN)

1	Green-Brown	Switch Column #1
2	N/C	Not Used
3	N/C	Not Used
4	N/C	Not Used
5	White-Brown	Switch Row #1
6	White-Red	Switch Row #2
7	White-Violet	Switch Row #7
8	N/C	Not Used
9	N/C	Not Used
10	Yellow-Red	Lamp Column #2
11	N/C	Not Used
12	Red-Black	Lamp Row #2

7P3/7J3-COIN DOOR SWITCHES (WHITE 15 PIN)

1	Yellow	6.3 VAC Display Lights
2	Yellow-White	6.3 VAC Display Lights
3	Red	Coil B+
4	Blue-Brown	Special Solenoid #1
5	N/C	Not Used
6	Green-Brown	Switch Column #1
7	N/C	Not Used
8	White-Orange	Switch Row #3
9	White-Yellow	Switch Row #4
10	White-Green	Switch Row #5
11	White-Blue	Switch Row #6
12	N/C	Not Used
13	White	Diagnostic Common
14	Green	Advance
15	Blue	Auto/Manual

PLAYFIELD/PINBOARD

8P1/8J1-PLAYFIELD SWITCHES AND LAMPS

1	Green-Red	Switch Column #2
2	Green-Orange	Switch Column #3
3	Green-Yellow	Switch Column #4
4	Green-Black	Switch Column #5
5	N/C	Not Used
6	White-Brown	Switch Row #1
7	White-Red	Switch Row #2
8	White-Orange	Switch Row #3
9	White-Yellow	Switch Row #4
10	White-Green	Switch Row #5
11	White-Blue	Switch Row #6
12	White-Violet	Switch Row #7
13	White-Gray	Switch Row #8
14	Yellow-Brown	Lamp Column #1
15	Yellow-Red	Lamp Column #2
16	N/C	Not Used
17	Red-Brown	Lamp Row #1
18	Red-Black	Lamp Row #2
19	Red-Orange	Lamp Row #3
20	Red-Yellow	Lamp Row #4
21	Red-Green	Lamp Row #5
22	Red-Blue	Lamp Row #6
23	Red-Violet	Lamp Row #7
24	Red-Gray	Lamp Row #8

PLAYFIELD/PINBOARD (Cont.)

Pin	Color	Function

8P2/8J2-PINBOARD LAMPS (WHITE 12 PIN)

1	Red-Brown	Lamp Row #1
2	Red-Black	Lamp Row #2
3	Red-Orange	Lamp Row #3
4	Red-Yellow	Lamp Row #4
5	Red-Green	Lamp Row #5
6	Red-Blue	Lamp Row #6
7	Red-Violet	Lamp Row #7
8	Red-Gray	Lamp Row #8
9	N/C	
10	Yellow-Black	Lamp Column 4
11	Yellow-Orange	Lamp Column 3
12	Yellow-Gray	Lamp Column 8

8P3/8J3 & 8P4/8J4-PINBOARD SOLENOIDS (WHITE 15 PIN)

1	N/C	Not Used
2	Gray-Black	Coil #8 8 Pin
3	Gray-Brown	Coil #1 1 Pin
4	Gray-Red	Coil #2 2 Pin
5	Gray-Orange	Coil #3 3 Pin
6	Gray-Yellow	Coil #4 4 Pin
7	Gray-Green	Coil #5 5 Pin
8	Gray-Blue	Coil #6 6 Pin
9	Gray-Violet	Coil #7 7 Pin
10	N/C	Not Used
11	Brown-Black	Coil #9 9 Pin
12	Brown-Red	Coil #10 10 Pin
13	Brown-Orange	Coil #11 Pin Reset Relay
14	N/C	Not Used
15	Red	Solenoid B+

9P1/9J1-INSERT BOX LAMPS (WHITE 24 PIN)

1	Yellow	6.3 VAC-Display Lamps
2	Yellow-White	6.3 VAC-Display Lamps
3	Yellow-Black	Lamp Column #4
4	Yellow-Red	Lamp Column #2
5	Yellow-Green	Lamp Column #5
6	Yellow-Blue	Lamp Column #6
7	Yellow-Violet	Lamp Column #7
8	Yellow-Gray	Lamp Column #8
9	N/C	Not Used
10	Red-Brown	Lamp Row #1
11	Red-Black	Lamp Row #2
12	Red-Orange	Lamp Row #3
13	Red-Yellow	Lamp Row #4
14	Red-Green	Lamp Row #5
15	Red-Blue	Lamp Row #6
16	Red-Violet	Lamp Row #7
17	Red-Gray	Lamp Row #8
18	N/C	Not Used

9P2/9J2-CATHODE KEEP ALIVE

1	White-Black	Keep Alive (-100 VDC)

)P3/9J3-ANODE KEEP ALIVE

1	Brown-White	Keep Alive (+100 VDC)

SOUND BOARD

Pin	Color	Function

10P1/10J1-POWER INPUTS

1	Gray	18.7 VAC
2-4	N/C	Not Used
5	Gray-White	18.7 VAC C.T.
6	N/C	Not Used
7	Key	Key
8	N/C	Not Used
9	Gray	18.7 VAC

10P2/10J2-SPEAKER OUTPUT

1	N/C	Not Used
2	Red	Speaker +
3	Black	Speaker Com
4	N/C	Not Used

10P3/10J3-SOUND SELECT INPUTS

1	Key	
2	Brown-Blue	Coil #14 Sound
3	Brown-Green	Coil #13 Sound
4	Brown-Gray	Coil #16 Sound
5	Brown-Violet	Coil #15 Sound
6	N/C	Not Used
7	Green	Pin Sound
8	N/C	Not Used
9	N/C	

10P4/10J4-JUMPER CONNECTOR

1	Brown	Audio In
2	Brown	Audio Out
3	Key	Key
4	N/C	Not Used

SOUND CONVERTER

11P1/11J1-PINBOARD COIL SOUND

1	N/C	Not Used
2	Gray-Brown	Pin 1
3	Gray-Red	Pin 2
4	Gray-Orange	Pin 3
5	Gray-Yellow	Pin 4
6	Gray-Green	Pin 5
7	Gray-Blue	Pin 6
8	Gray-Violet	Pin 7
9	Gray-Black	Pin 8
10	Brown-Black	Pin 9
11	Brown-Red	Pin 10
12	N/C	Not Used

11P2/11J2-LOGIC POWER

1	Black	Logic Ground
2	Green	Pin Sound
3	N/C	Not Used
4	Gray	Logic B+ (+5VDC)

SECTION 8
MECHANICAL ADJUSTMENTS

SWITCHES

There are different types of switches used throughout the game. The switch blades are made of a highly conductive spring type metal in various lengths, thickness, and form. Each switch is designed to satisfy specific operation conditions such as bounce, current carrying capacity, speed of operation, etc. Therefore, it is important to replace a blade with another of the same kind. When adjusting blades, never kink or bend sharply, as this causes fatigue which leads to fractures. Adjust blades with a sweeping, bowing motion, with a switch adjusting tool or duck bill pliers.

When switch adjustments are called for, before forming blades on any machine, check that the screws holding the switch stacks are down very tight. This is recommended because plastic spacers in the switch stacks will occasionally shrink by drying out causing a poor adjustment.

With the exception of a few instances, all blade type switches should have at least 1/32 inch between the contact points and should follow thru for at least 1/32 inch beyond the point at which the contacts close. This follow thru action provides a wiping motion between the contacts keeping them clean and insuring good contact between the points.

To adjust blade type switches properly, first adjust the actuating blade (usually, the longer one) with relation to the part that it contacts. Then set the gap and follow thru by adjusting the other blade.

SWITCH CONTACTS

All blade switch contacts are gold-plated and must NOT be burnished or filed. To clean the contacts, close them on a clean piece of paper (e.g. business card) and wipe gently until the contacts are clean.

DO NOT file or burnish any contacts. Severely pitted contacts should be replaced as an assembly.

Switch contacts should only be adjusted when they cause a malfunction or do not score properly.

ROLL-OVER LANE SWITCHES

Playfield switches are operated by a roll-over wire form which is actuated by the puck. Before the switch is adjusted, the wire should be centered in the playfield slot. The long wire form up. Adjust the short blade so that the switch closes with the puck just resting on the front edge of the wire rollover. To prevent switch vibration a back-up blade is used. It should be parallel and just barely in contact with the short blade.

SLAM TILT

The slam tilt on the coin door is adjustable. The normal adjustment is contacts open 1/32 inch.

SECTION 9
SPARE PARTS

The parts used on solid state shuffle alleys are standard Williams parts. Refer to the accompanying sketch for identification of various parts and adjustments.

Board #1-CPU Board, #2-Driver Board, #3-Power Supply Board #4-Master Display Board, and #10-Sound Board are the same boards that are used in the Williams Flipper System.

NOTE: When interchanging boards between games, be sure to have the proper ROMS, and PROMS installed.

PLAYFIELD CARE

The playfield on this machine has an improved finish with excellent wearing properties. A wax base cleaner with negligible abrasive qualities will extend board life to its full capabilities.

BACK GLASS REMOVAL

Unlock the key lock (Figure 2-No. 5) and remove back metal panel, pull back on lock brackets at inside top of back box. From the front of game, lift glass up and out.

SERVICE ELECTRONICS, BACK BOX

With back glass removed, loosen two locking screws ¼ turn, slide holding brackets to side, the score insert panel will then fold forward and down into the hood.

PIN INSERT PANEL

Remove the screw in front center of the hood, and the two ground straps from the sound board, then the pin insert panel will then slide out for service.

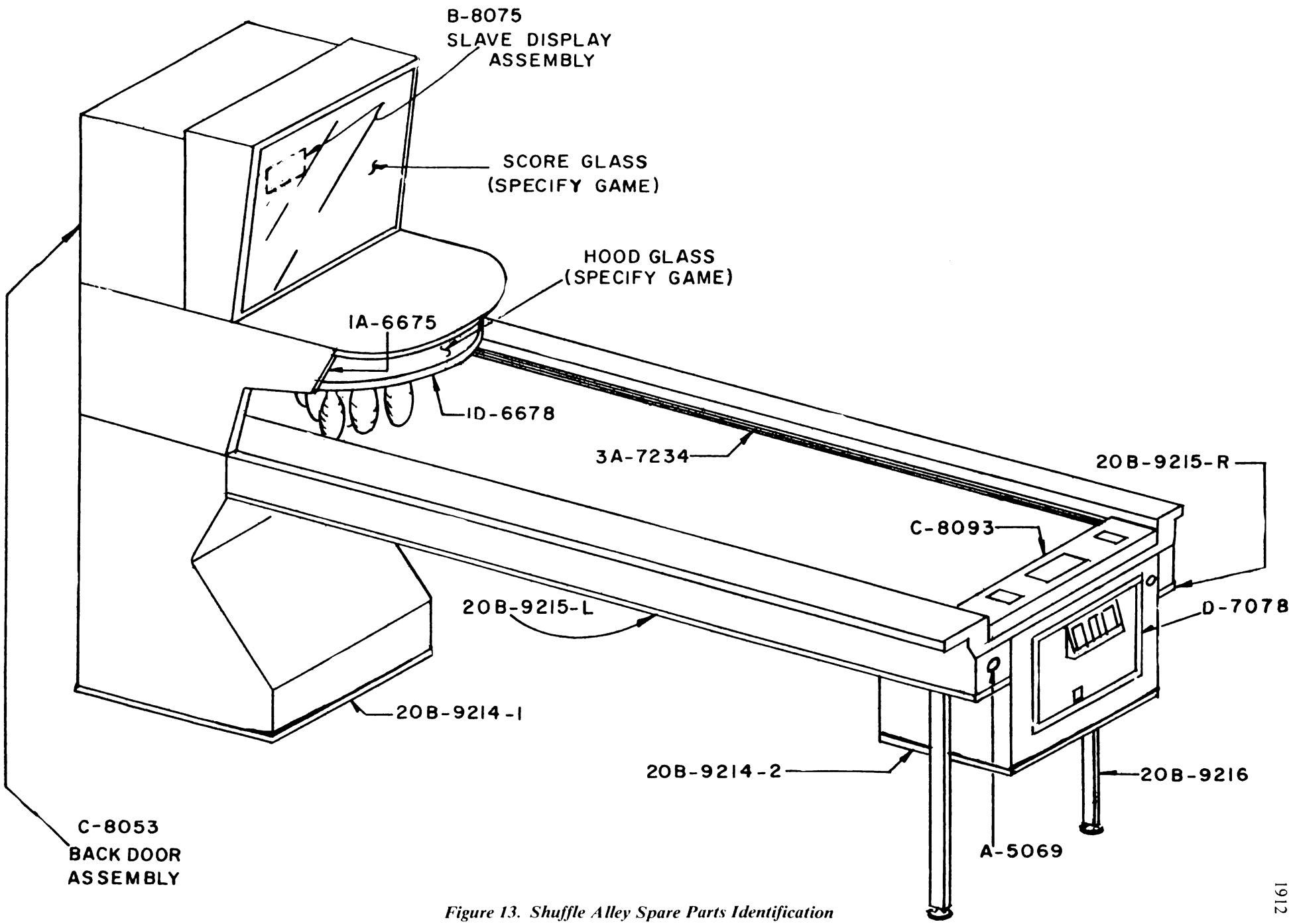

Figure 13. Shuffle Alley Spare Parts Identification