GAME NO. 627
SEPTEMBER 1978

MIDWAY'S ROTATION VIII

ELECTRICAL OPERATING INSTRUCTIONS

MIDWAY MFG. CO.
A BALLY COMPANY
10750 WEST GRAND AVENUE
FRANKLIN PARK, ILLINOIS 60131
U.S.A.

PHONE: (312) 451-1360 CABLE ADDRESS: MIDCO TELEX NO.: 72-1596

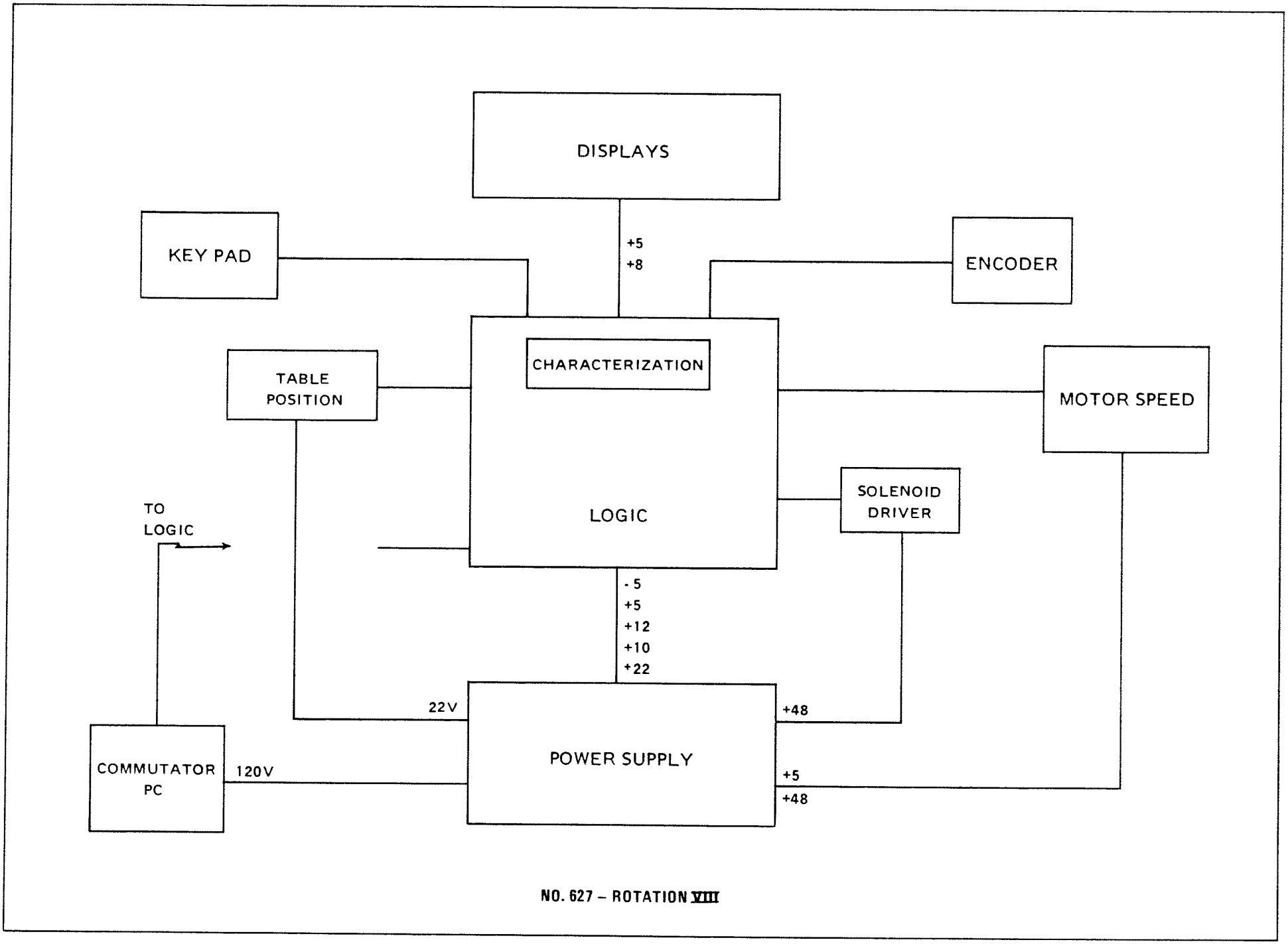
ROTATION 8

Operating Instructions

INDEX

ELECTRICAL

TABLE OF CONTENTS (Cont'd)



NO. 627 – ROTATION VIII

DO'S, DON'TS AND REMINDERS

DO . . . . . Read the manual completely (cover to cover).

DO . . . . . Call serviceman when needed.

DON'T . . . . . EVER turn table by hand with the ball in the shooter. It will fall into the bottom of the cabinet. At times it is difficult to remove the ball from the bottom of the cabinet.

DON'T . . . . . Turn the table if it is dragging or is jammed-up.

REMEMBER: The game will not turn if the ball is not in the outhole.

REMEMBER: Another player cannot "Punch In" when the table is turning.

REMEMBER: Once the game is beyond the first ball, the game in play must be finished before a new game can be started.

WHAT SHOULD HAPPEN WHEN THE GAME IS FIRST TURNED-ON

After the table has it's legs mounted, shipping bracket removed, table leveled, and the ball is on the table, plug it in, and turn it on. The "On-Off" switch is under the flipper between the west and south players. The game should do the following, all at once:

1. The lights around the edge of the playfield should turn on and remain on.
2. A musical note or series of notes should be heard.
3. The #1 ball in the "rack" should light.

   (The rack is a group of lamps arranged in the shape of a pool rack, see Fig. C).
4. The four-player displays (N,E,S,W) will light up with the "high score" value. If any of these conditions are not met, turn the game off IMMEDIATELY! Then see, "In Case Of Difficulty".

The next things to look for are:

1. The "Game Over" lamp will start flashing and remain flashing.
2. The #2 rack lamp should light along with the #1 rack lamp.
3. The four player displays will alternate between high score and last player score or "00" if just powered up.

The rack lamps should continue to light up the rack, in order, at an approximate 1 second rate. On the 15th rack lamp, the display will recycle (start at #1).


Rotation
NORTH
EAST
TILT
SOUTH
WEST
GAME OVER
COLLECT
CREDIT
BALL

RACK

FIG. C

At this time read:

"How To Get To The Keypad", then

"How To Run A Test", then

if your game has lost it's preset program in shipping, then Run "Test #8".

If your game is OK, read

"How To Start Game".

If you have trouble, see

"In Case Of Difficulty".

- - - - - - - - - - - -

HOW TO START GAME

To start the game THE BALL MUST BE IN THE OUT HOLE.

1. Open the coin door and flip the coin switch a few times. Make sure credits are adding up in the credit display. With each credit, a tone should be heard. Close the coin door.
2. Press a player call button. The credits will decrease and the number 1 will appear in the ball display. The playfield should turn to face you and then stop when it is exactly on target.
3. The ball will kick out of the out hole and land in the shooter.
4. The display of the location that you pressed should flash "00" in the 10's and 1's digits.
5. The shooter is located to the right of the call button and the flipper buttons are on each side.
6. PLAY THE GAME, Good Luck.

7. At the end of the game, the "Game Over" light should come on, your score and the high score are flashed alternately.

- - - - - - - - - - - -

HOW TO GET TO THE KEYPAD (Coin Door Call Button)

On each coin door, there is a small red button mounted on the upper-right part of the coin door. With this button, the keypad can be called to the coin door of your choosing. This MUST be done with the game in "Game Over" and the BALL IN THE OUT HOLE.

- - - - - - - - - - - -

HOW TO RUN A TEST

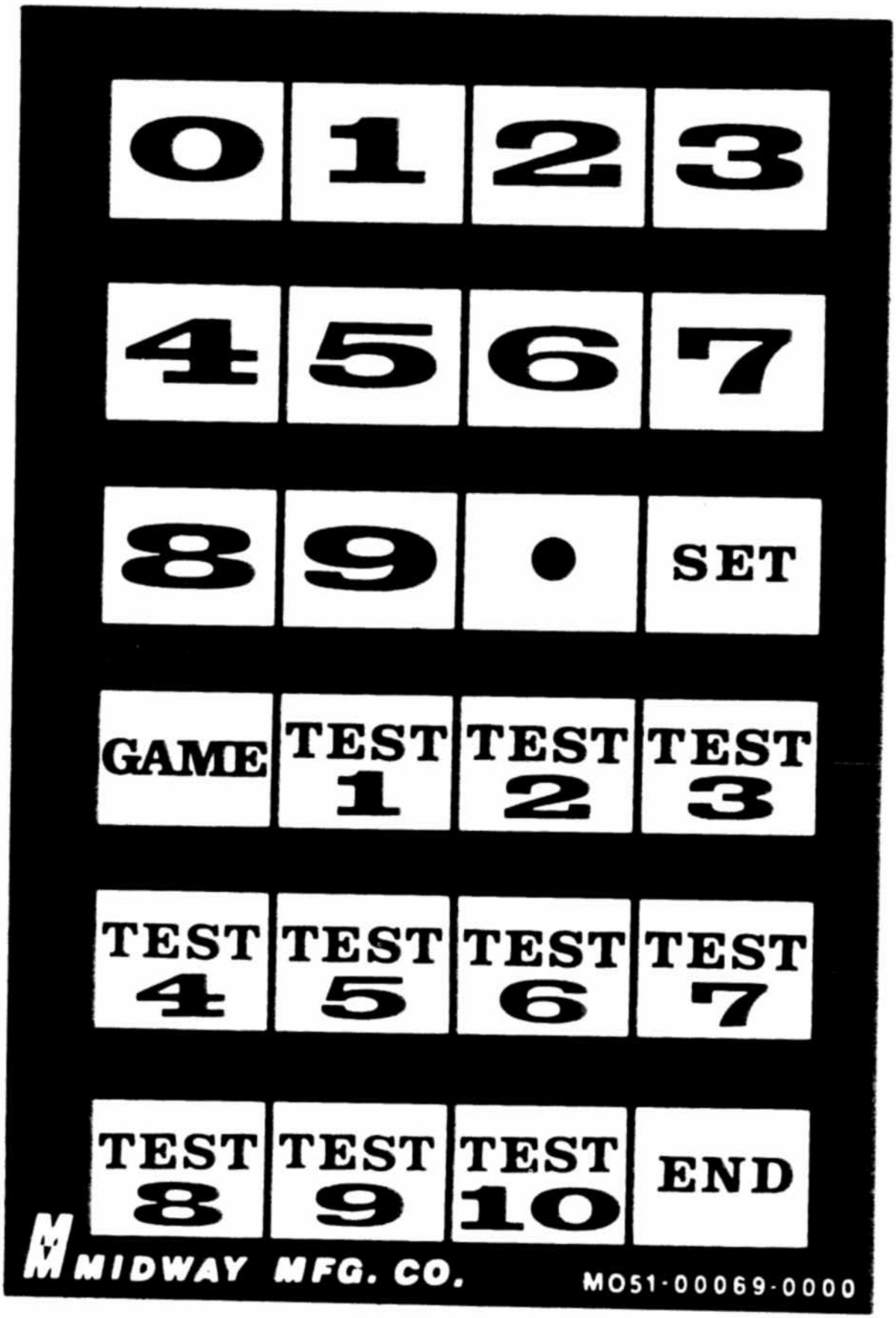
(see Fig. H)

All test MUST BE DONE IN "GAME OVER", WITH THE BALL IN THE "OUT HOLE".

Call the keypad to a coin door using the coin door call button. To use the test:

1. Press "Game".
2. Press "End".
3. Then press the desired test button, listed below.
4. When done testing, press "Game". If another test is to be run, repeat the above procedure.

(FIG. H)


0 1 2 3
4 5 6 7
8 9 • SET
GAME TEST 1 TEST 2 TEST 3
TEST 4 TEST 5 TEST 6 TEST 7
TEST 8 TEST 9 TEST 10 END
MIDWAY MFG. CO.
MO51-00069-0000

TEST INDEX

Test #1	Lamp Test
Test #2	Switch Test
Test #3	Solenoid Test
Test #4	Encoder Switch Test
Test #5	Display Test
Test #6	Table Position Test
Test #7	Not Used
Test #8	Factory/Operator Memory Preset
Test #9	Not Used
Test #10	Not Used

TEST #1 (see Figs. 1 and 2)

To test all light bulbs or to show if a column or row is bad. When pressed, ALL playfield lamps should be on. The lamps that are out, should be replaced. If a bulb was replaced and still does not light, see "In Case Of Difficulty".

TEST #2 (see Figs. 1 and 3)

Shows any closed switches. Test #2 should be done without the ball being on the playfield. This test is used in finding stuck, intermittent or non-functioning switches. Each switch has a code number, and it will be displayed in all the player displays. It is a two-digit number. The 10's digit shows which column it is on and the 1's digit shows which switch row it is on. A listing of switches by code number is listed in Fig. 3.

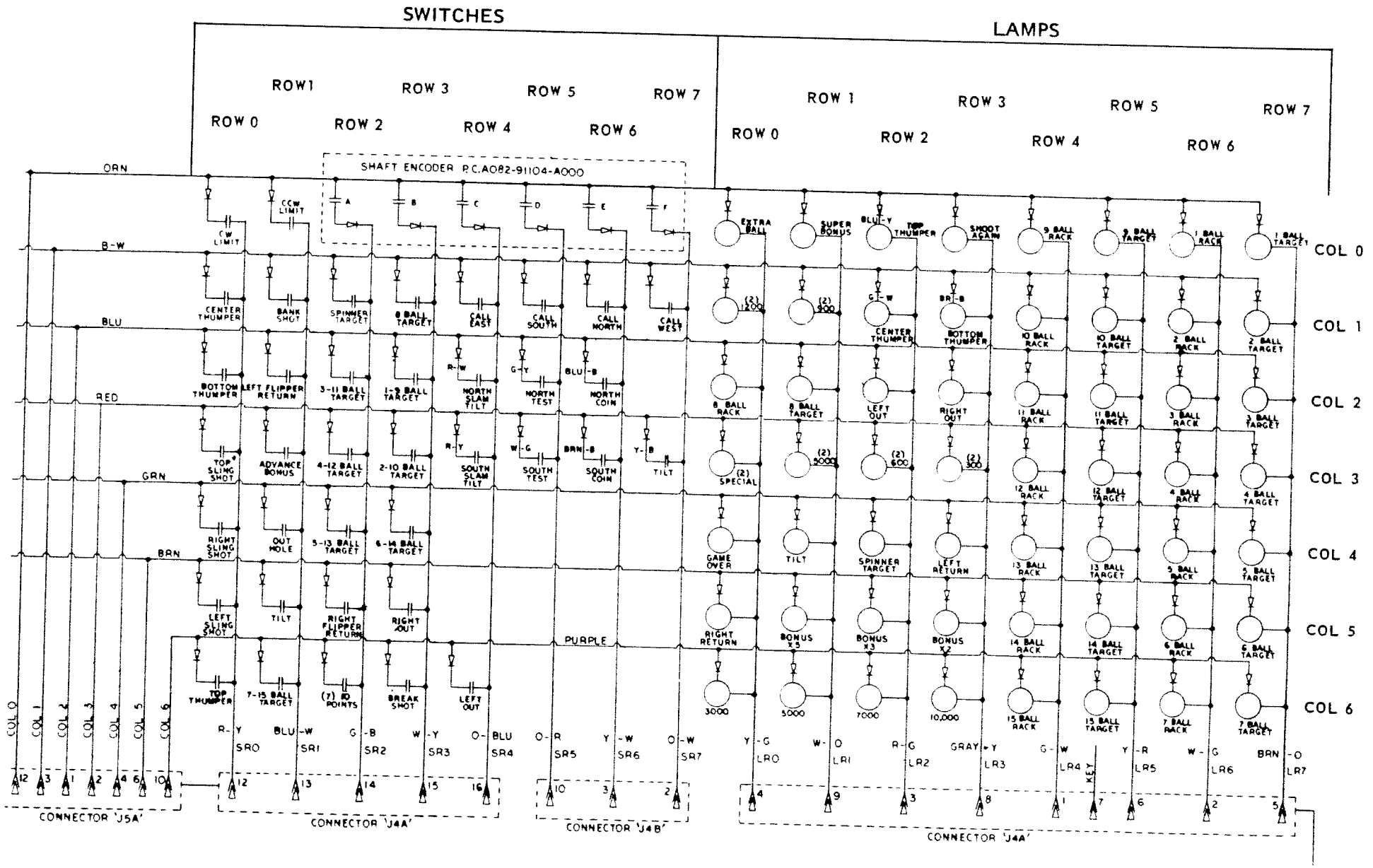
NOTE: The highest value switch will be displayed (Example: 30 will be displayed if 07 and 30 were on).

NOTE: If 41 is displayed, the ball was left in the out hole.

NOTE: If there are no stuck switches, then a number between 02 and 07 will be displayed. These numbers correspond to the angle encoder. To check out the encoder, use the encoder test and to check out the optical switch, use the table position test.

FIG. 1

(TESTS 1 & 2)



LOGIC BOARD

FIG 2

ROTATION 8

LAMP MATRIX

(TEST #1)

ROWS	C	O	L	U	M	N	S
	0	1	2	3	4	5	6
7	TARGET 1	TARGET 2	TARGET 3	TARGET 4	TARGET 5	TARGET 6	TARGET 7
6	RACK 1	RACK 2	RACK 3	RACK 4	RACK 5	RACK 6	RACK 7
5	TARGET 9	TARGET 10	TARGET 11	TARGET 12	TARGET 13	TARGET 14	TARGET 15
4	RACK 9	RACK 10	RACK 11	RACK 12	RACK 13	RACK 14	RACK 15
3	S.P.S.A	BOTTOM T.B.	RIGHT OUT LANE	BANK SHOT 300 (2)	LEFT FLIPPER RETURN	2X	BREAK SHOT 10K
2	TOP T.B.	CENTER T.B.	LEFT OUT LANE	BANK SHOT 600 (2)	SPINNER	3X	BREAK SHOT 7K
1	SUPER BONUS	BANK SHOT 900 (2)	TARGET 8	BANK SHOT 5000 (2)	TILT	5X	BREAK SHOT 5K
0	BREAK SHOT EXTRA BALL	BANK SHOT 1200 (2)	RACK 8	BANK SHOT SPOL (2)	GAME OVER	RIGHT FLIPPER RETURN	BREAK SHOT 3K

FIG. 3

TEST #2 LISTING:

Switch #	Description
00	CW SW OPTICAL ASSY. NOT SEEN, USUALLY
01	CCW SW OPTICAL ASSY. NOT SEEN, USUALLY
02	
03	GRAY CODE
04	SHAFT
05	POSITION
06	ENCODER
07	
10	CENTER T.B.
11	BANK SHOT OUTLANE
12	SPINNER
13	8 BALL TARGET
14	CALL EAST
15	CALL SOUTH
16	CALL NORTH
17	CALL WEST
20	BOTTOM T.B.
21	LEFT FLIPPER RETURN
22	3/11 TARGET
23	1/9 TARGET
24	NORTH SLAM (IF USED)
25	NORTH TEST BUTTON
26	NORTH COIN
27	NORTH TILT (IF USED)

Fig. 3 (cont.)

Switch #	Description
30	TOP SLING SHOT
31	BANK SHOT ADVANCE
32	4/12 TARGET
33	2/10 TARGET
34	SOUTH SLAM (IF USED)
35	SOUTH TEST
36	SOUTH COIN
37	SOUTH TILT
40	RIGHT SLING SHOT
41	OUTHOLE
42	5/13 TARGET
43	6/14 TARGET
44	----------
45	----------
46	-----
47	-----
50	LEFT SLING SHOT
51	-----
52	RIGHT FLIPPER RETURN
53	RIGHT OUT LANE
54	-----
55	-----
56	-----
57	-----

Fig. 3 (cont.)

Switch #	Description
60	TOP T.B.
61	7/15 TARGET
62	10 POINTS
63	BREAK SHOT HOLE
64	LEFT OUT LANE
65	-----
66	-----
67	-----

TEST #3 (see Fig. 4)

This test checks all solenoids. It energizes all solenoids automatically except the flippers, which are done manually. If the flippers need to be tested, press the flipper buttons on either side of the display, during the test. The flippers will then be energized automatically at the proper time. The test shows a code for what solenoid should be energized at that time. The code is shown in the ball display. A listing of solenoid code numbers and energization order is shown below.

NOTE: If the ball was in the out hole, it will be ejected to the shooter. Do not turn the table as the ball will fall off the table and into the cabinet. Also remember the game will not start or turn without the ball in the out hole.

FIG 4

Solenoid #	Name
40	OUTHOLE
41	BANK SHOT
42	CENTER T.B.
43	BOTTOM T.B.
44	TOP T.B.
45	TOP SLING SHOT
46	RIGHT SLING SHOT
47	LEFT SLING SHOT
50	BREAK SHOT
53	3 FLIPPERS

TEST #4 (see Fig. 5)

This test shows the code number for the encoder switches. This number is displayed in the ball display. At the center of each player's location, the encoder should have a certain code number:

NORTH	00
EAST	20
SOUTH	40
WEST	60

As the table is rotated, the count should go up when turned clockwise, and should go down when turned counterclockwise. Since the game is using an electronic system, it will count in octal arithmetic. An 8 or a 9 will never be displayed in the 1's digit.

TEST #5

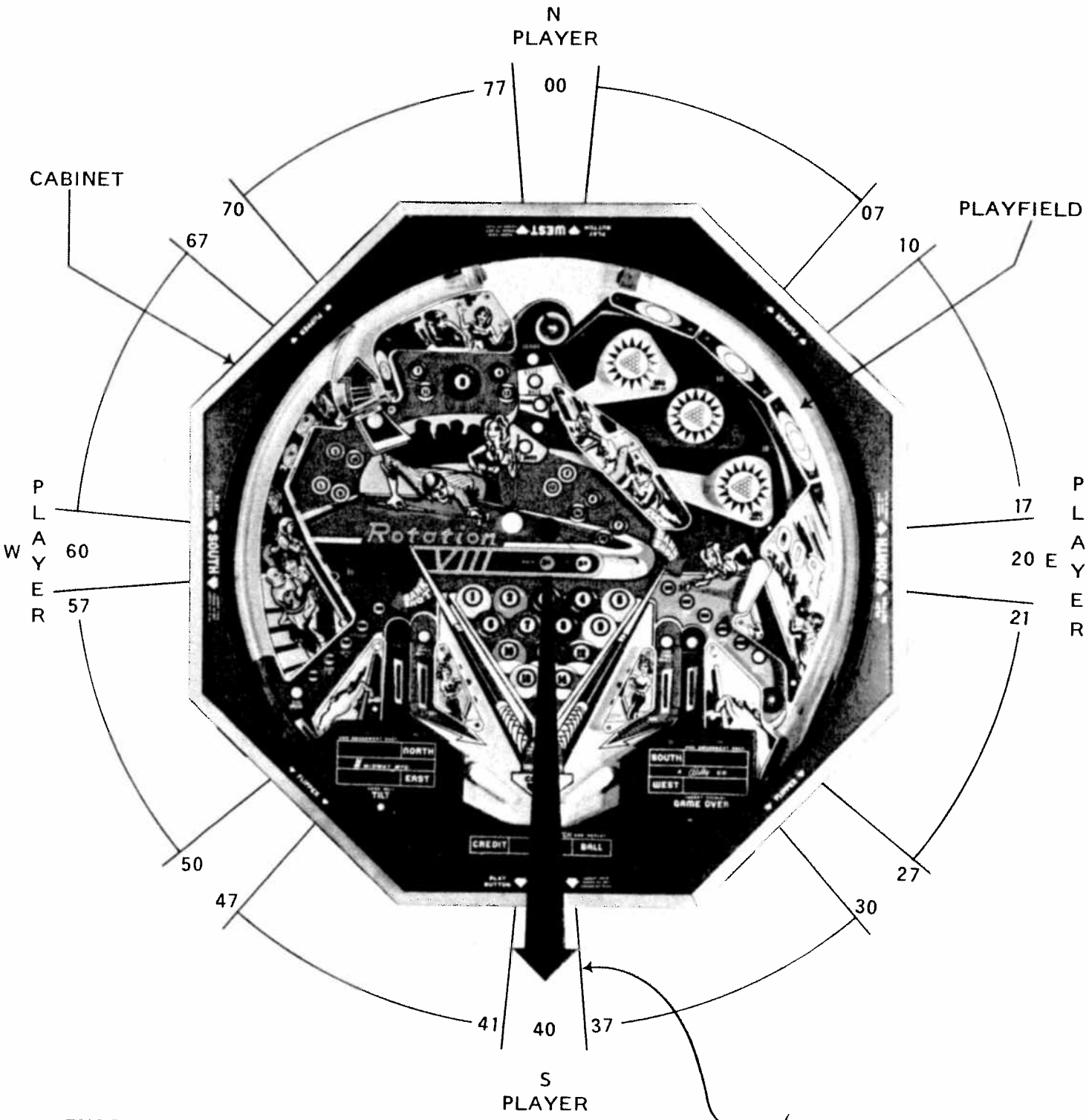
This test checks the display. It will run through the numbers 0 to 9 on each digit of all the displays except the middle two digits of the credit/ball display.

TEST #6 (see Fig. 6)

This tests the table position switch. This is not a mechanical switch, it uses the reflection of infrared light to sense it's location. The table should stop on location code 3. Area 3 is the exact place the table will stop. Areas 1 and 2 are indexes to find area 3. The area code will be displayed in the ball display.

Reading	Meaning
0	NEITHER SW ON
1	CW " "
2	CCW " "
3	BOTH " " (HOME POSITION)

FIG. 5



ENCODER — READINGS

(OVER HEAD VIEW
GAME IN CABINET)

(TEST 4)

EXAMPLE:
THE CODE DISPLAY
WOULD BE 40.

FIGURE 6

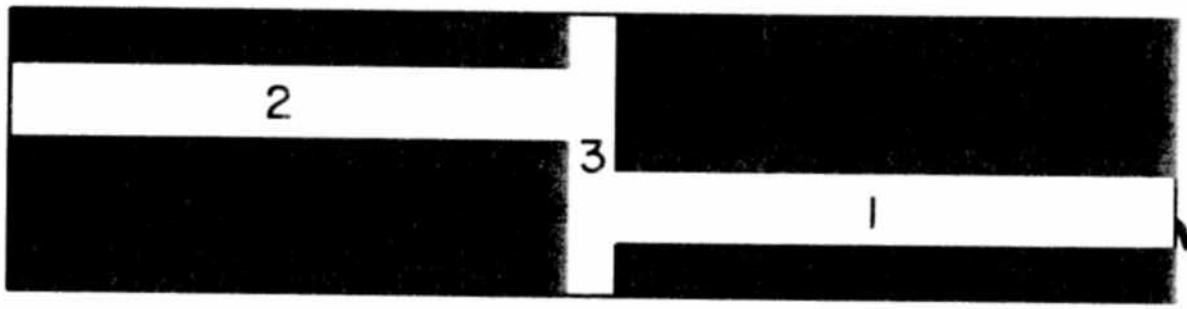


TABLE POSITION REFLECTOR

(WHITE SHOWS REFLECTIVE AREAS)

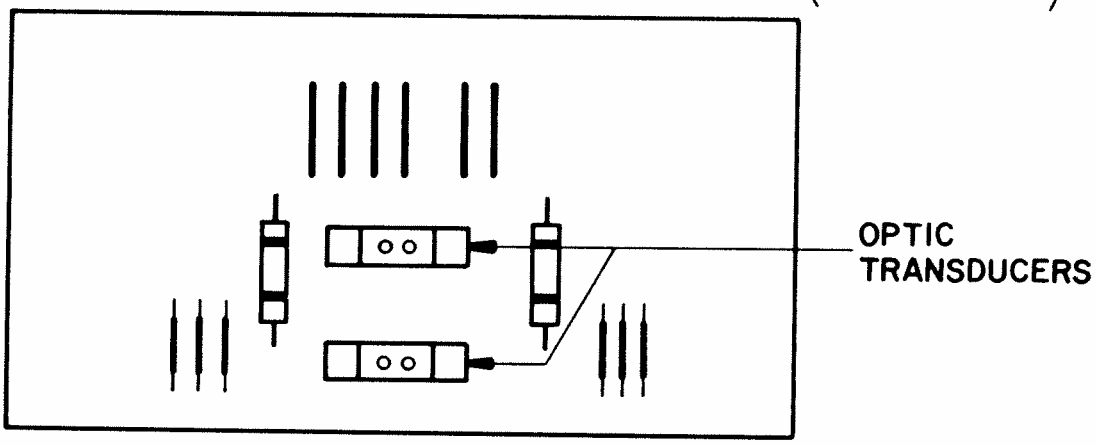


TABLE POSITION BOARD

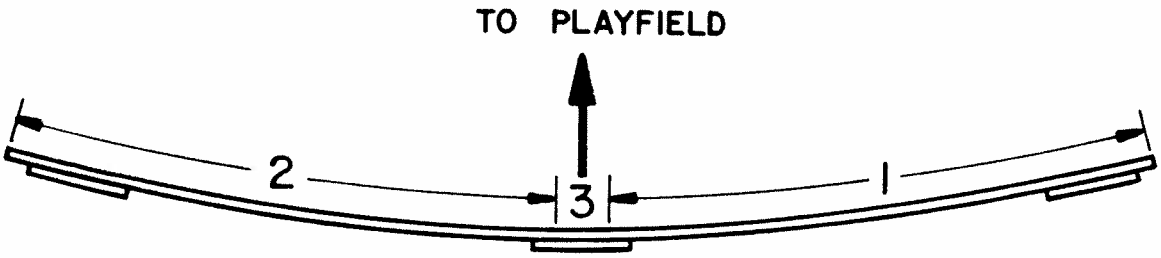


TABLE POSITION REFLECTIVE BRACKET

(TEST #6)

TEST #8

This is not really a test, it is a Factory/Operator Preset. It sets the game options to factory specifications. A listing of the setup can be found in the "How To Use The Cocktail Pin Keypad".

HOW TO SET THE GAME YOU WANT (Programming)

See "How To Use The Cocktail Pin Keypad".

IN CASE OF DIFFICULTY

FEATURE LAMPS; TEST 1.

Burnt Out Lamps.

Replace lamps that are out. If the lamps still do not light up, follow the procedure given below.

— Check to see if all the lamps that are out are on the same column or row. If exactly 7 lamps are out, chances are that a row driver will have to be replaced. If 8 lamps are out, a column drive is probably the cause. One way to verify this is to check the wiring diagram. On the upper-right hand corner of the diagram is a matrix which shows which lamps are on what column or row. If the lamps that are out correspond to a particular row or column, then changing that particular driver transistor may solve the problem.

Another way to check for bad columns or rows is to look at the color of the wire going to all the lamps that are out. If the same colored wire goes to all of them, then a row or column driver may be at fault.

VERY BRIGHT LAMPS OR LAMPS ON ALL THE TIME

This problem may arise because of column or row driver problems. Follow the procedure mentioned for BURNT OUT LAMPS in order to determine the malfunctioning row or column.

NOTE: See Fig. 7 to determine the location of column and row transistors.

NO LAMPS

Check feature lamp fuse.

Check logic fuse.

Check wiring and lamp jacks.

SWITCHES; TEST #2

Always Closed:

Adjust switch manually.

Intermittent:

Adjust switch.

Switch Does Not Work:

Check wiring.

SOLENOIDS; TEST #3

Solenoid Stuck On:

1. Check solenoid driver board and make sure that none of the transistors are shorting.
2. Check the wiring.
3. Check the UDN 2981 chips on the logic and driver board. (see Fig. 7)