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## I. INSTALLATION

### **Assemble the game as follows:**

Bolt legs to cabinet. Using flat washers under bolt heads, bolt back box to cabinet. Feed cable connectors and ground braid through cable port in back box. Screw ground braid to braid in back box. Insert connectors so they are completely seated on printed circuit board assemblies.

On all games there are some items that must be checked after shipment. Making these visual inspections may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable connectors may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switches should always be adjusted after game is set on location and leg levelers are adjusted.

### **Visual inspections before plugging in line cord:**

1. Check wiring of transformer to correspond to location voltage.
2. Check the transformer for any foreign material shorting across wiring lugs.
3. Check that fuses are firmly seated and making good contact.
4. Check wire on coils for proper soldering. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
5. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
6. Check for any wires that may have become disconnected.
7. Check that all cable connectors are completely seated on printed circuit board assemblies.
8. Check that cables are clear of all moving parts.

### **Check adjustment of the three (normally open) tilt switches:**

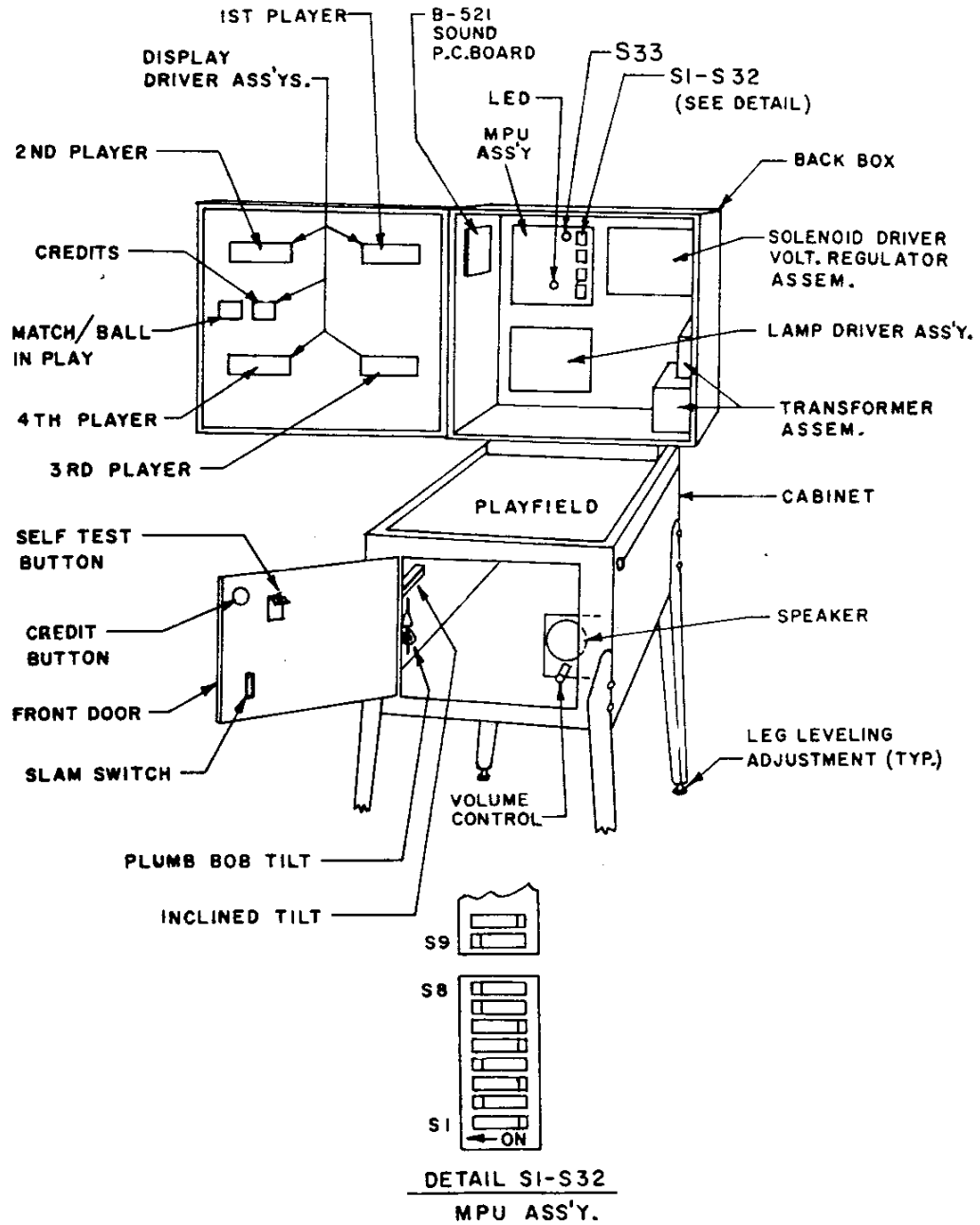
1. Plumb bob tilt on left side of cabinet near front door.
2. Ball tilt above plumb bob tilt. Insert the smaller ball (gold 15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.
3. Panel tilt on bottom of playfield panel.

### **NOTE**

TO PROTECT SOLID STATE COMPONENTS  
BEFORE TOUCHING ANY COMPONENT IN THE  
BACK BOX, DISCHARGE ANY POSSIBLE STATIC  
BUILD-UP BY TOUCHING ANY GROUND  
CIRCUIT, e.g. SIDE ARMOR, GROUND BRAID.

# ELECTRONIC PIN BALL GAME

Figure 1



## II. GENERAL GAME OPERATION

### PLACE BALL INTO PLAYFIELD BY OUTHOLE:

**COIN GAME.** Coin should be rejected. Plug in line cord. For proper game operation grounding circuit must be used. Move power ON-OFF Toggle Switch at bottom right front corner of cabinet to "ON" position. The game will play a tune to announce game-readiness. Drop targets are reset, scores are reset to zero, alternating with the "high Game to Date," and the game is ready for play. Coin Game. The game should accept the coin and post credits\* for coins accepted (Adjustable). Pressing the credit button on the door will cause the outhole kicker to move the ball to the shooter lane. The 1st player-up lite becomes lit. A tune\* is played to announce play-readiness.

One player is registered each time the credit button is pressed (one to four can play). The credits are reduced by one each time the credit button is pressed until the credits are reduced to zero. Credit button is in-operative after 4 player's are registered.

Shooting the ball initiates play. Rebound switches score 10-points or 100 points, or 300 points and advances bonus. Thumper-bumper scores 100 points in 5 ball, 1000 points in 3 ball.

When the ball enters the outhole, the bonus score is added to the players score. The player-up and/or ball in play on the back box is advanced one position. The bonus score starts at 1,000 points. The outhole kicker moves the ball to the shooter lane and play is resumed. This continues until each player has played the allowable number of balls per game (adjustable). At this time the "Game Over" light becomes lit. A random Match\* number appears and the "Match" light becomes lit. If the match number is the same as the last two digits in the player's score a free game is awarded.

Extra Ball won during the course of the game is played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play are not advanced for extra ball play. Bonus score is added to the player's score and the bonus is set to 1,000 points before the game moves the extra ball for play.

At the end of the game, a "High Game to Date" is alternately flashed with all player scores. If the "High Game to Date" is beat, this feature\* can award up to 3 free games.

Tilting the game results in loss of the ball in play. The flippers, thumper-bumpers, etc., go "dead". Bonus score is not added. The purpose of the tilt penalty is to discourage the player from jostling the machine in an attempt to prolong play. Game action becomes normal after the outhole kicker moves the ball to the shooter lane.

Slamming the machine results in the loss of the game. All feature lights go out and the game becomes "dead" through a built-in time delay circuit. The purpose of the time delay circuit is to discourage abuse of the machine. After the delay, the "Game Over" light lites and the game readiness tune is played. The time delay occurs anytime one of the slam switches is made to contact.

There is a slam switch on the front door. One on the tilt board and one on the playfield. (Any number of slam switches could be installed by the operator, to meet his individual requirement). The switch should be adjusted to have approximately 1/16" gap between the contacts. The weighed blade should be adjusted to attain the desired sensitivity. Decreasing gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

\* Some tunes and features can be disabled by operator is so desired. \*\*\* See back box adjustments. \*\*\*\*

### III. FRONT DOOR GAME ADJUSTMENTS:

#### HIGH SCORE FEATURE ADJUSTMENTS:

The game is designed to award an extra ball or a free game (option) at three score levels. (See High Score Feature in game book). The recommended levels are on the score card on the game.

Any level from 10,000 or 990,000 can be set, as desired. It is also possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button at one second intervals five times or until number 01 appears on the Match/Ball in Play display.
2. The number on the Player Score Displays is the first score level\*. It can be increased, if desired, by holding the credit button in. To decrease the score level, reset to '00', and then hold the credit button in. Release the credit button when the desired High Score appears. Note that the level changes 10,000 points at a time. If the number '00' is left on the displays, the high score feature is eliminated for that level.
3. Repeat steps 1 and 2 for the second and third high score levels. The number '02' and '03' on the Match/Ball-in-Play display are for the second and third levels, respectively.

NOTE: Only One Extra Ball Can Be Achieved Per Ball In Play.

#### HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games (option) when "High Game to Date" is beat. For the recommended, factory present level, see game book.

It is recommended that the level, which will build with game play, be periodically reset to the factory recommended level to encourage game play. The adjustment procedure is the same as for the High Score Feature Adjustment, Steps 1 and 2. Continue pushing the Self-Test button until the number '04' appears on the Match/Ball-in-Play display and then do Step 2.

Any level from '00' to 990,000 can be set as described. It is to be noted that '00' does not turn off the feature, as it does on High Score feature. The feature is turned off by positioning switches to the "OFF" position.

\*Can be quickly set to '00' by pressing S33 on the MPU assembly in the back box.

### IV. FEATURE OPERATION & SCORING

#### BONUS SCORE FEATURE:

A bonus score of 1,000 to 19,000 may be scored. The game starts with a bonus score of 1,000. The bonus score advances one step at a time, every FOURTH spin of the spinning target, each time the rebound rubbers hit in the left middle of the playfield. Single bonus advances are also scored when the stationary target is hit, or the ball going thru the return lanes when not lit. The two outlanes advance the bonus steps as does the left upper rollover button, rollover button between flipper and shooter lane and the return lanes when lit. The bonus is collected when the ball goes into the outhole or the eject pocket (upper left).

#### TOP LANE FEATURE:

Right & Left Top Lanes score 3,000 points unless the 9,000 point lite is lit (by making either the top or middle rollover). Center Lane scores 5,000 points and extra ball (When lit, by making left side 3 bank drop target 2nd time).

**3 BANK DROP TARGET FEATURE (UPPER RIGHT):**

Each target scores 500 points.

- 1st TIME DOWN: Double bonus is awarded. The lower 2X lite goes out when ball goes into the outhole and the Bonus Score is collected.
- 2nd TIME DOWN: Triple Bonus is awarded. The lower 3X lite goes out when the ball goes into the outhole and three times the lit Bonus Score is collected.
- 3rd TIME DOWN: Five times the Bonus is awarded. The lower 5X lite goes out when the ball leaves the playfield and the bonus is collected.

EVERYTIME all drop targets are down an additional 6,000 points is awarded.

**3 BANK DROP TARGET FEATURE (LEFT SIDE):**

Middle target scores 500 points. Other 2 targets score 1,000 points.

- 1st TIME DOWN: Lites "Lights Extra Ball Lane" (Adjustable to By-pass).
- 2nd TIME DOWN: Lites Extra Ball Lane (Right return lane) and lites "Score Special".
- 3rd TIME DOWN: Scores special adjustable to:
  - 1) Go Out — 1 special per ball
  - 2) Open Ended — Continues to award special every time

**SPECIAL LITE FEATURE**

Adjustable to Award

- 1) 1 free game
- 2) 1 extra ball
- 3) 1 free game and 1 extra ball
- 4) 100,000 points

EVERYTIME all drop targets are down an additional 10,000 points is awarded.

**EXTRA BALL FEATURE:**

When the 3 Bank Target (left side) is made for the 2nd time, the center top lane is lit for extra ball. The ball going thru the lane when lit awards an extra ball and lites the Shoot Again lite.

**STATIONARY TARGET:**

The stationary target scores 5,000 points and advances bonus one step, also lites Return Lanes for extra bonus steps.

**EJECT POCKET (UPPER LEFT):**

The eject pocket located upper left scores the Lit Bonus Value.

**SPINNER FEATURE:**

Spinner scores 100 points, when the bonus reaches 10,000 the Spinner Scores 1,000 when lit lite lights, and the Spinner Scores 1,000 points. Every Fourth spin of the spinner advances the bonus 1,000 points.

**ROLLOVER BUTTONS:**

Top & Middle Rollover Buttons score 100 points and lite Right & Left Top lanes for 9,000 points.

Left & Right Rollovers score 3,000 points and 3 bonus step advances.

**THUMPER BUMPER:**

Thumper-Bumper score 100 points on 5 balls and 1,000 points on 3 balls.

**RETURN LANES:**

Score 1,000 points & advance bonus unless the lite is lit (by hitting the stationary target) then they score 5,000 and 3 bonus step advances when the ball travels thru.

**OUTLANES:**

Score 3,000 and 3 Bonus Advances.

**REBOUND RUBBER SWITCH (LOWER LEFT):**

Scores 300 points and 1 Bonus Advance.

**SLING SHOTS AND REBOUND RUBBER SWITCH:**

Score 10 points.

## V. GAME ADJUSTMENTS

### A. Playfield Post Adjustments:

Posts that control left and right outlane openings on playfield can be moved to make access to outlanes conservative or liberal for ball to enter. See Figure 2.

Conservative entry will decrease playing time and scoring.  
Liberal entry will increase playing time and scoring.

### B. Back Box Game Adjustments:

Each game has thirty-two switches located on the MPU module, located in the back box, that allow play to be customized to the location. See Figure 1. Credits per coin, maximum credits, credit display, balls per game, match feature, high game feature, special award and melody are selectable by means of the switches. The switches contained in four-sixteen lead packages numbered S1-8, S9-16, S17-24 and S25-32 for easy identification. The "On toggle" position is marked on the assembly. **TURN OFF POWER BEFORE MAKING ADJUSTMENTS. MAKE ADJUSTMENTS BEFORE TURNING POWER BACK ON.**

MPU SWITCH ASSIGNMENT	
1 thru 5	Coin Chute No. 2 Center
6	High Score
7	Ball Per Game
8	Chime Melody
9 thru 13	Coin Chute No. 3
14	Return Lanes
15-16	High Game To Date
17 thru 19	Max. Credits
20	Credit Display
21	Match Feature
22	Special Selection
23	Electronic Sound
24	Bonus Countdown
25	Not Used
26	Extra Ball Lane
27	Not Used
28 thru 30	Coin Chute No. 1
31-32	Special Award

RECOMMENDED SCORES	3 BALL	5 BALL
1st SCORE LEVEL	190,000	240,000
2nd SCORE LEVEL	280,000	420,000
3rd SCORE LEVEL	-----	-----
HIGH SCORE TO DATE	400,000	540,000



**1. HIGH SCORE FEATURE:**

The game is designed to award an Extra Ball or Free Game at one, two or three high levels. See Front Door Game Adjustments.

AWARD	SWITCH 6
EXTRA BALL	OFF
REPLAY	ON

**2. BALL PER GAME:**

NO. OF BALLS PER GAME:	SWITCH 7
5	ON
3	OFF

**3. MELODY OPTION:**

The game is designed to play melodies to announce power-up, credit, etc. Some tunes are adjustable by Switch 8.

GAME MELODY	SWITCH 8	MELODY
POWER-UP.....	ON	Full Melody
"	OFF	Full Melody
COIN .....	ON	Full Melody
"	ON	2 Tones Only
CREDIT BUTTON ..	ON	Full Melody
"	OFF	2 Tones Only
GAME OVER .....	ON	Full Melody
"	OFF	Full Melody

**4. RETURN LANE lamps after making the stationary target.**

SW 14 ON (Stay ON FOR THE ENTIRE BALL)  
 SW 14 OFF (Goes OFF AFTER BEING MADE)

**5. HIGH GAME TO DATE FEATURE:**

The game is designed to award up to 3 free games as an option of high score to date is beat. Each time this happens, the winning score becomes the new high game score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play.

	SWITCH	
	16	15
NOVELTY	OFF	OFF
1 FREE GAME	OFF	ON
2 FREE GAMES	ON	OFF
3 FREE GAMES	ON	ON

**MAXIMUM CREDITS:**

The maximum credits accepted by the machine limits the number of the games that can be accumulated by coining, by winning replays or both. The maximum number of credits are adjustable by means of switches 17, 18 and 19. Eight credit limits are available. Switch settings are listed below:

MAXIMUM CREDITS	SWITCHES		
	19	18	17
5.....	OFF	OFF	OFF
10.....	OFF	OFF	ON
15.....	OFF	ON	OFF
20.....	OFF	ON	ON
25.....	ON	OFF	OFF
30.....	ON	OFF	ON
35.....	ON	ON	OFF
40.....	ON	ON	ON

**7. CREDIT DISPLAY:**

<b>CREDITS DISPLAY</b>	<b>SWITCH 20</b>
YES	ON
NO	OFF

**8. MATCH FEATURE:**

When the MATCH FEATURE is ON a random number appears in the "MATCH/BALL in PLAY" window and the word MATCH is illuminated. If the number matches the tens digit in a player's score a free game is awarded. The MATCH feature creates an incentive to play.

<b>MATCH</b>	<b>SWITCH 21</b>
ON	ON
OFF	OFF

**9. SPECIAL:**

The number of replays made per ball from the 3 BANK DROP TARGET (LEFT SIDE).

	<b>SWITCH 22</b>
1 Special per ball	ON
Opened Ended	OFF

**10. ELECTRONIC SOUND:**

The game will produce COMPUTER TYPE SOUNDS.

<b>COMPUTER TYPE SOUNDS</b>	<b>SWITCH 23</b>
	ON

**11. BONUS COUNTDOWN:**

The method of bonus countdown can be adjusted as follows:

	<b>SWITCH 24</b>
1,000 Steps	ON
Multiply Steps	OFF

**12. EXTRA BALL:**

This option can be adjusted as follows:

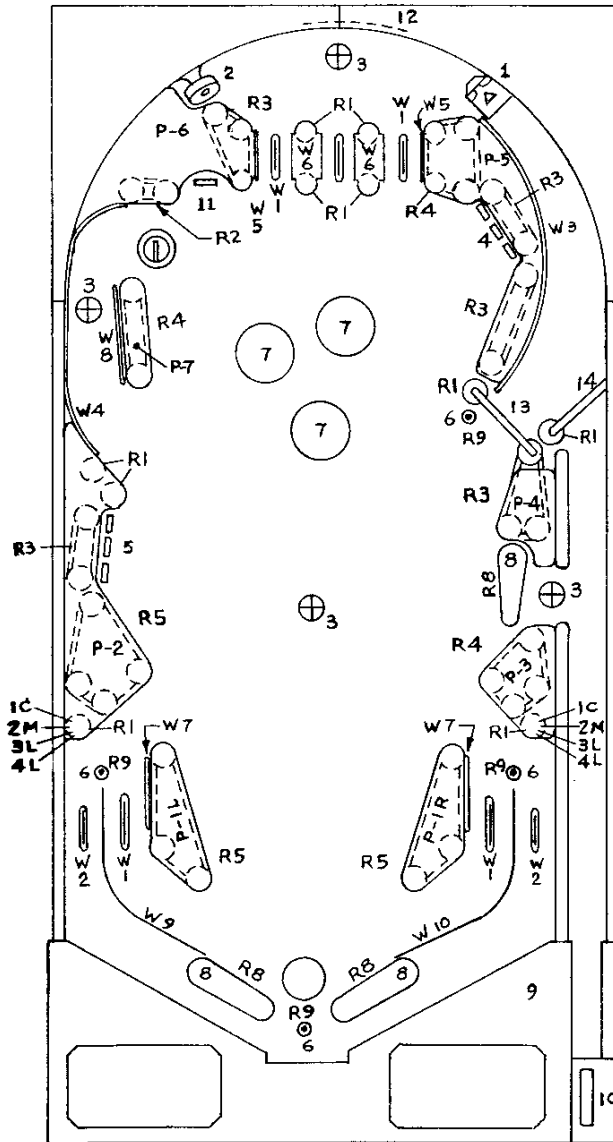
	<b>SWITCH 26</b>
NO EXTRA BALL (BYPASS)	OFF
AWARD EXTRA BALL	ON

**13. SPECIAL AWARD:**

Award received for hitting the 5 Bank Drop Target Down; the required number of times can be adjusted as follows:

<b>AWARD</b>	<b>SWITCHES</b>	<b>POSITION</b>
FREE BALL	31	ON
	32	OFF
FREE GAME	31	OFF
	32	ON
100,000 POINTS	31	OFF
	32	OFF
FREE BALL AND	31	ON
FREE GAME	32	ON

# NUGENT — Playfield Chart



## RUBBER RINGS

- R1-7A-120-031
- R2-7A-120-100
- R3-7A-120-150
- R4-7A-120-200
- R5-7A-120-250
- R8-7A-121-Y
- R9-7A-125

## BALL GUIDES & ROLL OVERS

- |             |             |
|-------------|-------------|
| W1-A-149    | W6-4A-224-R |
| W2-A-383    | W7-6A-101   |
| W3-B-543    | W8-6A-101-C |
| W4-B-544    | W9-6A-219   |
| W5-6A-101-H | W10-6A-227  |

## PLAYFIELD PLASTIC SHIELDS

- TOP ARCH SET 13C-23-1L & 1R
- NUGENT SET 13A-108-1 TO -7 (P-1 TO P-7)

## MISCELLANEOUS PARTS

1. BALL GATE A-104-R-1
2. REBOUND RUBBER A-105
3. ROLL-OVER BUTTON 4B-241
4. BANK TARGET D-393-3-1
5. BANK TARGET D-393-3-1A
6. BALL GUIDE POST 2A-206
7. THUMPER CAP 13A-12-2
8. FLIPPER & SHAFT A-193
9. INSTRUCTION PLATE 14B-1-4
10. SHOOTER GAUGE 14A-2-3
11. TARGET ASSEMBLY A-461
12. TOP ARCH RAIL 6B-222
13. SPIN TARGET B-439-4
14. ANTI-RETURN GAME A-471

## POST ADJUSTMENT

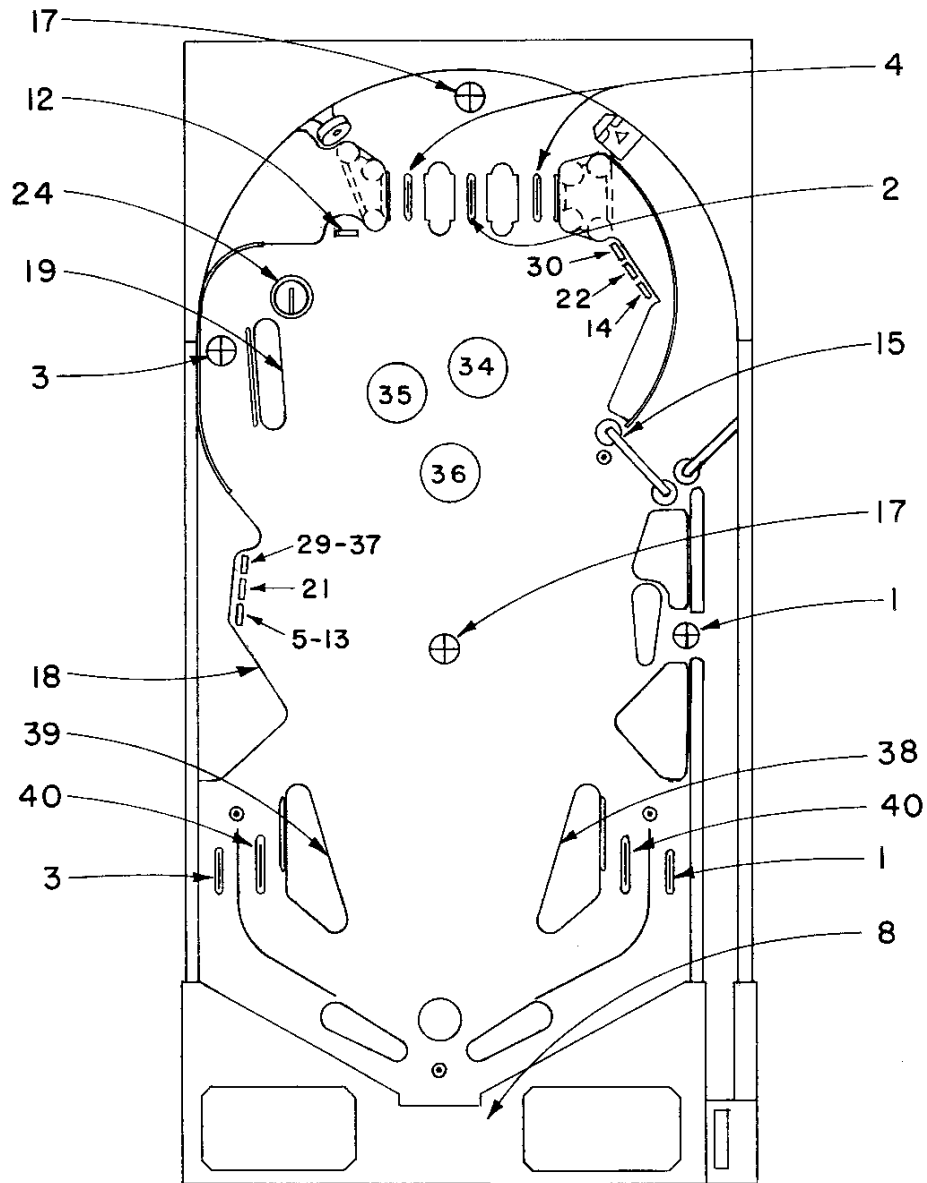
- 1C - CONSERVATIVE
- 2M - MEDIUM
- 3L & 4L - LIBERAL

**VI. SWITCH IDENTIFICATION**  
**Self Test Display Numbers**

SWITCH NO.	SWITCH LOCATION	SWITCH NO.	SWITCH LOCATION
1	ROLL-OVER BUTTON (RIGHT)	21	#2 TARGET (LEFT BANK)
1	RIGHT OUTLANE	22	#2 TARGET (RIGHT BANK)
2	UPPER ROLLOVER (CENTER)	23	
3	LEFT OUTLANE & LEFT ROLL-OVER BUT.	24	KICKER (SAUCER)
4	UPPER ROLLOVERS (R & L)	25	
5	TARGET #1, LEFT BANK (SW-1)	26	
6	CREDIT BUTTON	27	
7	TILT	28	
8	OUT-HOLE	29	TARGET #3, LEFT BANK (SW-1)
9	COIN #3 (RIGHT)	30	#1 TARGET (RIGHT BANK)
10	COIN #1 (CENTER)	31	
11	COIN #2 (LEFT)	32	
12	TARGET (STAND-UP)	33	
13	TARGET #1, LEFT BANK (SW-2)	34	
14	#3 TARGET (RIGHT BANK)	35	
15	SPIN-TARGET	36	
16	SLAM-TILT (3)	37	TARGET #3, LEFT BANK (SW-2)
17	(2) ROLL-OVER BUTTON (CENTER)	38	RIGHT SLING-SHOT
18	300 ADVANCE BONUS	39	LEFT SLING-SHOT
19	10 POINTS	40	RIGHT & LEFT RETURN LANES
20			

**NOTES:** 1. Flipper Button Cabinet Switches Do Not Appear On Test.

## SWITCHES



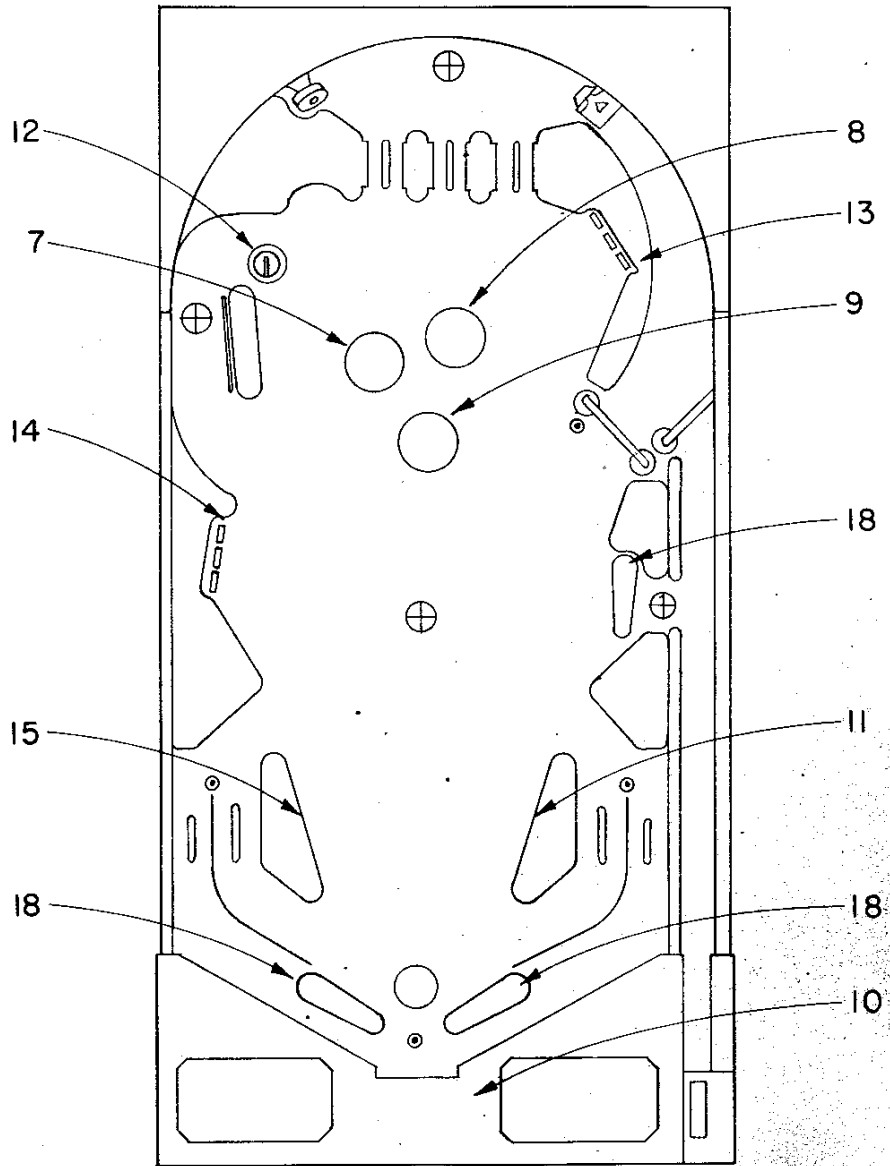
### SWITCHES NOT ON PLAYFIELD:

- |                 |                          |
|-----------------|--------------------------|
| 6 CREDIT BUTTON | 11 LEFT CHUTE            |
| 7 ROLL TILT     | 10 CENTER CHUTE          |
| 7 PENDULUM      | 16 TILTBOARD VIB.        |
| 9 RIGHT CHUTE   | 16 DOOR & PLAYFIELD VIB. |

**VII. SOLENOID IDENTIFICATION**  
**Self Test Display Numbers**

SOLENOID NO.	SOLENOID LOCATION
7	LEFT THUMPER
8	RIGHT THUMPER
9	CENTER THUMPER
10	OUT-HOLE
11	RIGHT SLING SHOT
12	SAUCER
13	3-BANK DROP TARGET (RIGHT)
14	3-BANK DROP TARGET (LEFT)
15	LEFT SLING SHOT
16	
17	KNOCKER
18	FLIPPERS
19	COIN LOCK-OUT

SOLENOIDS



SOLENOIDS NOT ON PLAYFIELD:

17 KNOCKER

19 LOCK-OUTS

**VIII. PARTS LIST  
GAME #108 NUGENT**

**MISCELLANEOUS\***

	PART NUMBER
Transformer (Domestic or Export) .....	16B-3
Transformer & Rectifier Board .....	C-464
Bulbs, #44 .....	8A-101

**ASSEMBLY COILS**

Coin Lockout .....	C-36-5500
Flipper Left & Right (2), Total 3 .....	J-25-500/34-5050
Knocker .....	N-26-1200
Outhole Kicker .....	J-26-1100
Saucer Eject (1) .....	J-28-2300
Thumper-Bumper 3 .....	J-26-1200
Sling-Shot (2) .....	J-26-1200
Drop Target Reset (2) .....	B-27-2300

**MODULES**

Lamp Driver .....	B-431
Display Driver (5 Used) .....	A-434
Solenoid Driver/Voltage Regulator .....	B-432
MPU .....	C-433-105
Rectifier Board .....	A-430
Sound Board .....	B-521

**PLAYFIELD PARTS** ..... SEE PLAYFIELD DIAGRAM