

# COSMIC PRINCES



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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:**

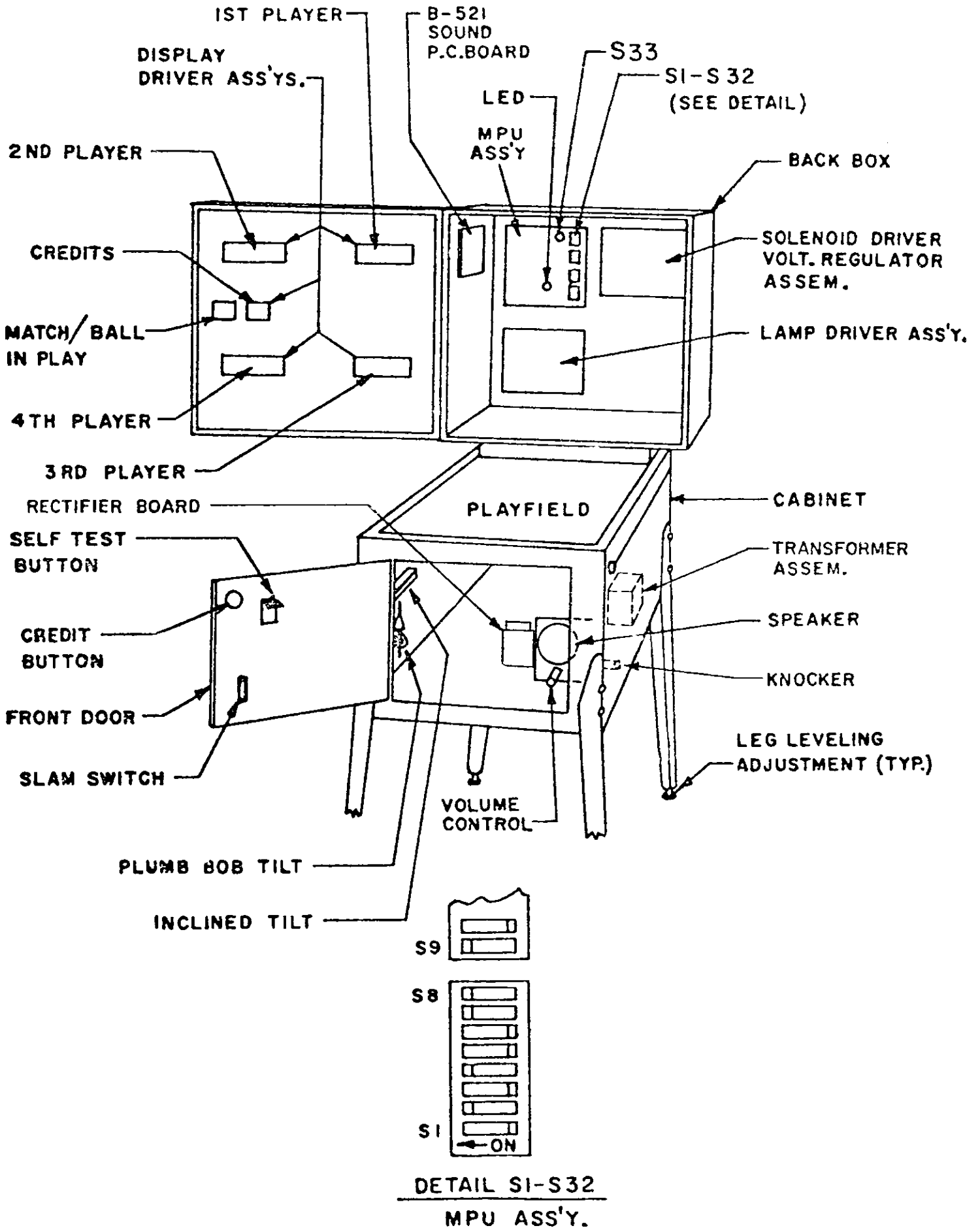
1. Plumb bob tilt on left side of cabinet near front door.
2. Ball tilt above plumb bob tilt. Insert the smaller ball (gold 15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.
3. Panel tilt on bottom of 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. Top Thumper-Bumper scores 1,000 and advances Bonus. Two remaining Thumper-Bumpers score 100 points in 5 ball, 1,000 points in 3 ball. Slingshots and Rebound Switches score 10 points.

When the ball enters the outhole, the bonus score is added to the player's 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 if 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 1,000 bonus score. The bonus score is advanced by 1,000 every time the ball goes thru one of the top rollover lanes, hits one of the stationary targets, top thumper bumper or goes over the star rollover located on the upper left (top and/or bottom). The inner most return lanes and both outlanes score 3 bonus advances (3,000 points).

#### STATIONARY TARGETS & TOP ROLLOVER LANES:

Scores 1,000 points and advance bonus.

- LIGHTING:
- #1 lane or star rollover lites left spinner lite for additional 400 points.
  - #2 target or lane lites left spinner lite for additional 400 points.
  - #4 target or lane lites right spinner lite for additional 400 points.
  - #5 lane or star rollover lites right spinner lite for additional 400 points.
  - #3 rollover lane lites 1,000 point lite alternating between the left and right spinner.

Spotting 1 thru 5 lites left inner return lane.

Spotting 1 thru 5 second time scores special.

Each time the ball enters the outhole the feature resets.

#### SPINNER FEATURE:

Left Spinner scores 200 points

Plus 400 points additional after the "1" is spotted,  
400 points additional after the "2" is spotted.

Right Spinner scores 200 points

Plus 400 points additional after the "4" is spotted,  
400 points additional after the "5" is spotted.

Both spinners score 1,000 points additional after the "3" rollover lane is made (lite alternates between spinners after lighting). Both spinners reset to 200 points each time the ball enters the outhole.

**DROP TARGET ASSEMBLY:**

Targets Score 500 points.

Start: 2 targets up — 5000 lite on, targets down, scores additional 5000 points, lites 2X lite (for award) and advances lite to 10,000.

1st Time: 3 Targets up — targets down scores additional 10,000 points lites 3X lite (for award) and advances lite to 20,000.

2nd Time: 4 targets up — targets down scores additional 20,000 points, lites 4X lite (for award) and advances lite to 30,000.

3rd Time: 5 targets up — targets down lites 5X lite (for award) and scores additional 30,000 points.

NOTE: 2nd or 3rd reset (adjustable) will lite lower right inner return lane for Special.

Each additional time 5 targets up, upper special lite on.

All targets down score special (adjustable).

Each time the ball enters the outhole the feature resets to 2 targets.

**THUMPER BUMPERS:**

Top Thumper Bumper scores 1,000 and advance bonus. Bottom (2) Thumper Bumpers scores 1,000 points on 3 ball and 100 points on 5 ball game.

**EJECT POCKET:**

Collects bonus & Multiplier, Bonus then resets 1,000, Retains Multiplier. Each time the ball enters the outhole the feature resets.

**STAR ROLLOVER BUTTONS:**

- Top Scores 10 points
- Upper Left Spot No. 5 plus scores 1,000 points and advance bonus.
- Middle Left & Lower Middle Scores 1,000 points and increases the middle return lane value.
- Lower Left Spot No. 1 plus scores 1,000 points and advance bonus.
- Outlanes Score 5,000 points and 3 bonus advances

**SLINGSHOTS:**

Slingshots score 10 points.

**RETURN LANES:**

The two inner return lanes both score 5,000 points and 3 bonus advances.

Left inner return lane lites for extra ball award after the numbers 1 thru 5 are spotted.

Right inner return lane lites for special award after 2nd or 3rd drop target (adjustable).

Middle return lanes score 2,000 points plus lited value (Lane Value is increased by the middle upper left, star rollover and lower middle star rollover).

**OUTLANES:**

Both Outlanes score 5,000 points & 3 Bonus Advances.

**COLLECT BONUS:**

When the ball enters the outhole or eject pocket the bonus is collected and then the bonus is reset to 1,000.

**RECOMMENDED SETTING**

	<b>3 BALL</b>	<b>5 BALL</b>
1st Level	360,000	540,000
2nd Level	520,000	680,000
3rd Level	—	—
High Score TO DATE	700,000	800,000
Instruction Card	12B-2-111-22	12B-2-111-22A

## 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 allows 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 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	Tone Melody
9 thru 13	Coin Chute No. 3 (Right)
14	N/U
15-16	High Game To Date
17 thru 19	Max. Credits
20	Credit Display
21	Match Feature
22	N/U
23	Extra Ball Lane
24	Outlane Special On
25	Target Special
26	Outlane Special
27	Extra Ball Alternation
28 thru 30	Coin Chute No. 1
31-32	Special Award



**1. HIGH SCORE FEATURE:**

The game is designed to award an Extra Ball or Free Game at one, two or three high score 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
"	OFF	2 Tones Only
CREDIT BUTTON.....	ON	Full Melody
"	OFF	2 Tones Only
GAME OVER.....	ON	Full Melody
"	OFF	Full Melody

**4. 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

**5. MAXIMUM CREDITS:**

The maximum credits accepted by the machine limits the number of 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

**6. CREDIT DISPLAY:**

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

**7. 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 features creates an incentive to play.

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

**8. EXTRA BALL:**

This option can be adjusted as follows:

<b>NO EXTRA BALL (BYPASS)</b>	<b>SWITCH 23</b>
<b>AWARD EXTRA BALL</b>	OFF
	ON

**9. OUTLANE SPECIAL:**

<b>Special Lite on After 2nd Target Reset</b>	<b>SWITCH 24</b>
<b>Special Lite on After 3rd Target Reset</b>	OFF
	ON

**10. TARGET SPECIAL:**

The numbers of replays made after Drop Target resets 4 times can be adjusted as follows:

<b>OPENED ENDED</b>	<b>SWITCH 25</b>
<b>1 SPECIAL PER BALL</b>	OFF
	ON

**11. OUTLANE SPECIAL:**

The numbers of replays made after lighting the special in the outlane can be adjusted as follows:

<b>OPEN ENDED</b>	<b>SWITCH 26</b>
<b>1 SPECIAL PER BALL</b>	OFF
	ON

**12. EXTRA BALL ALTERNATION:**

When Extra Ball lane is lit or Extra Ball lane & Special lane are on it/they can be adjusted as follows:

<b>CONSTANT ON</b>	<b>SWITCH 27</b>
(No Alternation)	OFF
<b>ALTERNATE ON AND OFF</b>	ON
(Inner Lane Alternating With Outlane)	

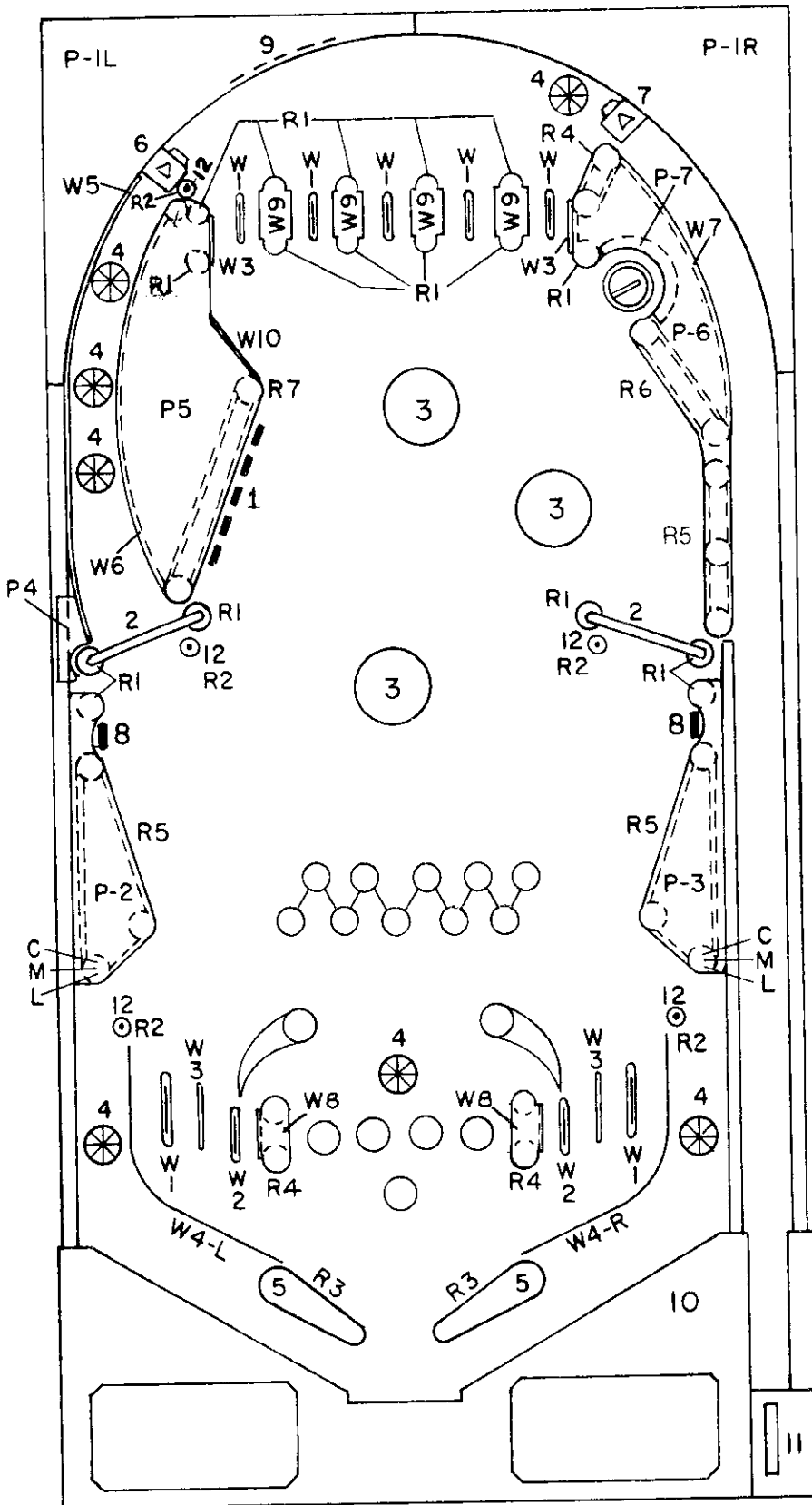
**13. SPECIAL AWARD:**

Award received when hitting the rotating "Special" lite on the Stationary Targets, when Special light is lit 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 & FREE GAME	31	ON
	32	ON

# COSMIC PRINCESS

## PLAYFIELD PARTS



### RUBBER RINGS

R1-7A-120-031  
 R2-7A-125  
 R3-7A-121  
 R4-7A-120-100  
 R5-7A-120-225  
 R6-7A-120-150  
 R7-7A-120-300

### BALL GUIDES & ROLL-OVERS

W1-A-149	W5-B-608
W2-A-383	W6-B-609
W3-6A-101-G	W7-B-610
W4-6A-274-R&L	W8-4A-110-R
W4-6A-274-R&L	W9-4A-121-Y
	W10-6A-101

### PLAYFIELD PLASTIC SHIELDS

Top Arch Set 13C-111-1R & 1L  
 Cosmic Prin. Set 13C-111-2 to -7  
 (p-1 to P-7)

### OTHER PARTS & ASSEMS.'S.

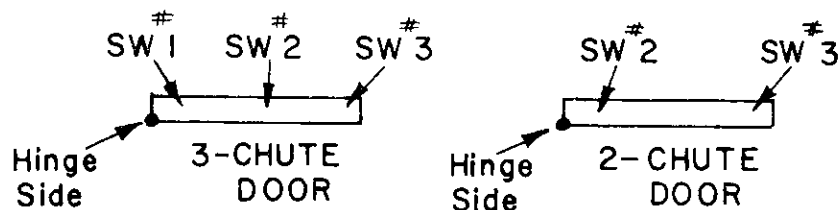
1. 5-Bank Target D-548-5R-2
2. Spin Target A-563-3
3. Thumper Cap 13A-29
4. Rollover Button 4B-275
5. Flipper & Shaft A-193
6. Ball Gate, Left A-104-L
7. Ball Gate, Right A-104-R
8. Target Ass'y A-461-1
9. Top Arch Rail 6B-222
10. Instruction Plate 14B-32
11. Shooter Gauge 14A-2-5
12. Ball Guide Post 2A-200

### POST ADJUSTMENT:

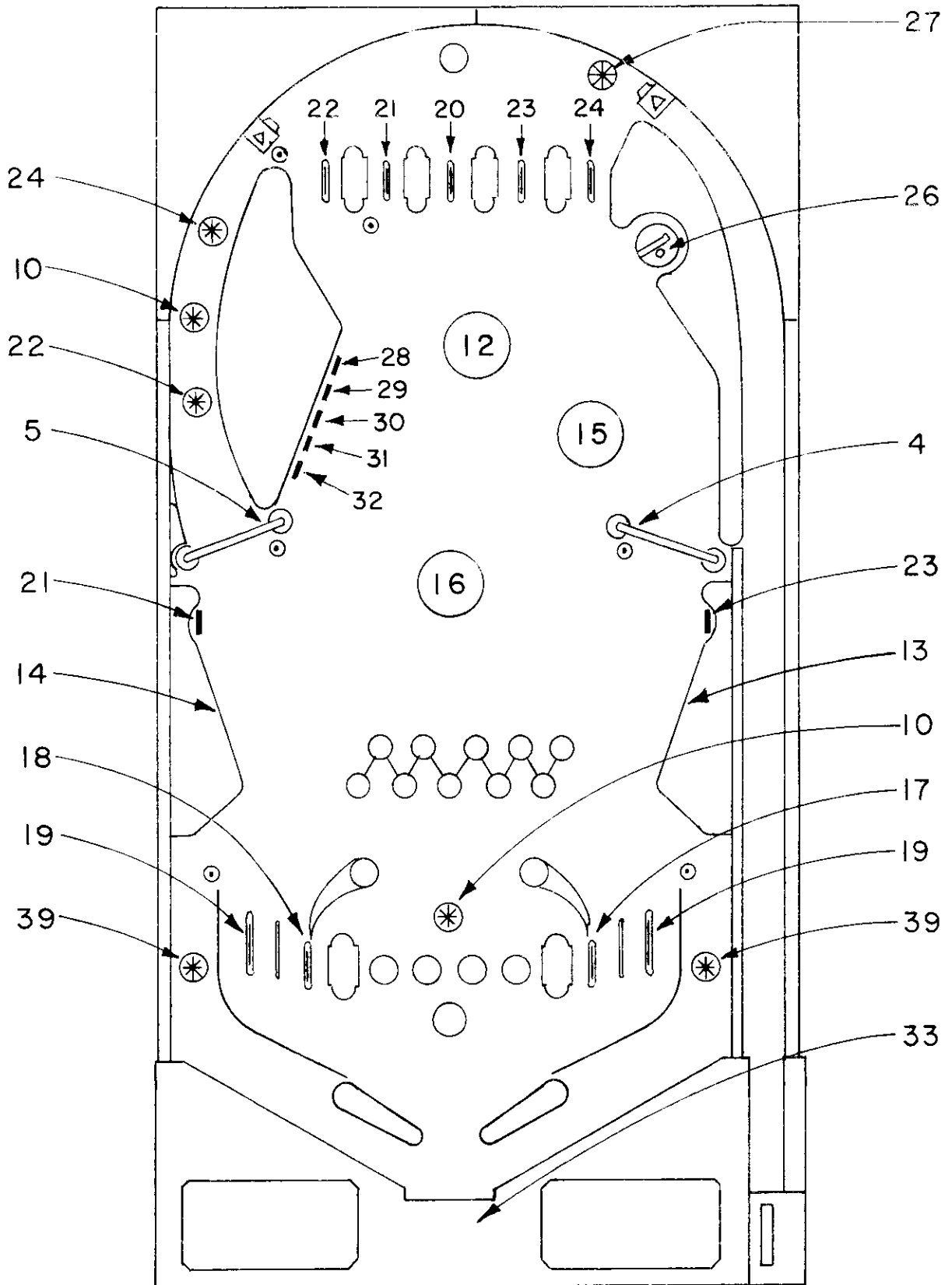
C-CONSERVATIVE  
 M-MEDIUM  
 L-LIBERAL

COSMIC PRINCESS  
SWITCH IDENTIFICATION  
 Self Test Display Numbers

<u>SWITCH NO.</u>	<u>SWITCH LOCATION</u>	<u>SWITCH NO.</u>	<u>SWITCH LOCATION</u>
1	COIN CHUTE SEE	21	UPPER ROLL-OVER #2 & LEFT ST. UP TARGET
2	COIN CHUTE DRWG.	22	UPPER ROLL-OVER #1 & R.O.B.
3	COIN CHUTE BELOW	23	UPPER ROLL-OVER #4 & RIGHT ST. UP TARGET
4	SPIN TARGET (RIGHT)	24	UPPER ROLL-OVER #5
5	SPIN TARGET (LEFT)	25	OPEN
6	CREDIT BUTTON	26	EJECT POCKET (SAUCER)
7	TILTS	27	UPPER RIGHT ROLL-OVER BUTTON
8	SLAM & VIB. TILTS	28	DROP TARGET #5
9	OPEN	29	DROP TARGET #4
10	(2) ROLL-OVER BUTTON	30	DROP TARGET #3
11	OPEN	31	DROP TARGET #2
12	TOP THUMPER	32	DROP TARGET #1
13	RIGHT SLING-SHOT	33	OUT-HOLE
14	LEFT SLING-SHOT	34	OPEN
15	RIGHT THUMPER	35	OPEN
16	LEFT THUMPER	36	OPEN
17	RIGHT INNER LANE (5,000)	37	OPEN
18	LEFT INNER LANE (3,000)	38	OPEN
19	RETURN LANES (RIGHT & LEFT)	39	LEFT & RIGHT OUT-LANE (ROLL-O-BUTTON)
20	UPPER ROLL-OVER #3	40	OPEN



SWITCHES  
COSMIC PRINCESS



SWITCHES NOT ON PLAYFIELD

- |                 |                         |
|-----------------|-------------------------|
| 6 CREDIT BUTTON | * 3 LEFT CHUTE          |
| 7 ROLL TILT     | * 2 CENTER CHUTE        |
| 7 PENDULUM      | 8 TILT BOARD            |
| * 1 RIGHT CHUTE | 8 DOOR & PLAYFIELD VIB. |

\* SEE DR'WG, ON SWITCH IDENT. PAGE.

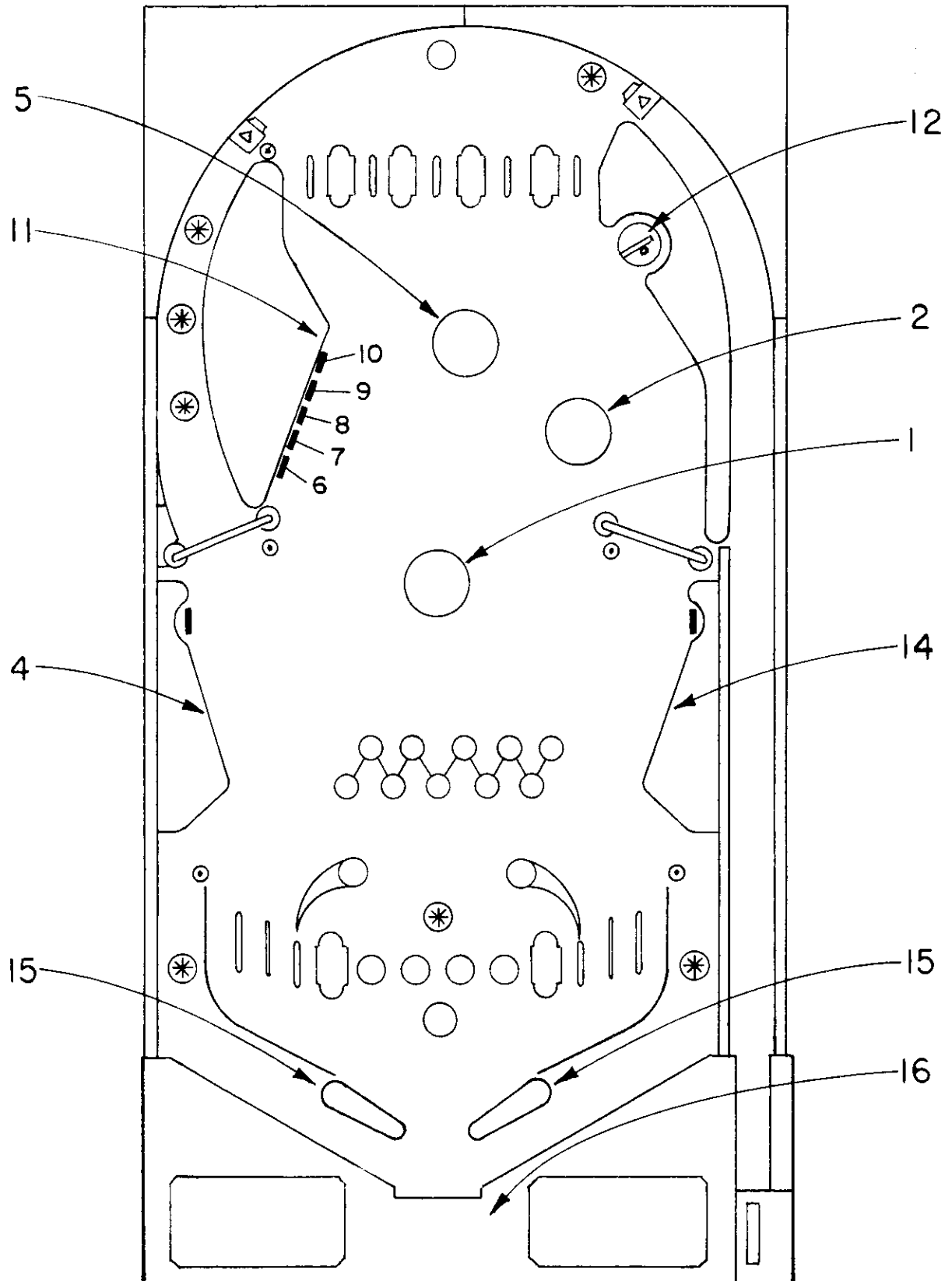
COSMIC PRINCESS  
SOLENOID LOCATION  
 Self Test Display Numbers

SOLENOID NO.

SOLENOID LOCATION

1	.....	LEFT THUMPER
2	.....	RIGHT THUMPER
3	.....	KNOCKER
4	.....	LEFT SLING-SHOT
5	.....	TOP THUMPER
6	.....	DROP TARGET #1
7	.....	DROP TARGET #2
8	.....	DROP TARGET #3
9	.....	DROP TARGET #4
10	.....	DROP TARGET #5
11	.....	5-BANK DROP TARGET
12	.....	EJECT POCKET (SAUCER)
13	.....	OPEN
14	.....	RIGHT SLING-SHOT
15	.....	FLIPPERS
16	.....	OUT-HOLE
17	.....	OPEN
18	.....	OPEN
19	.....	COIN LOCK-OUTS
20 THRU 25	.....	SOUND

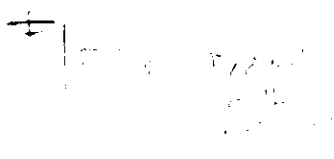
SOLENOIDS  
COSMIC PRINCESS



SOLENOIDS NOT ON PLAYFIELD :

3-KNOCKER

19-LOCK-OUTS



**VIII. PARTS LIST  
GAME #111 COSMIC PRINCESS**

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

Coin Lockout (1).....	C-36-5600
Flipper Left & Right (2).....	J-25-500/34-5050
Knocker (1).....	N-26-1200
Outhole Kicker (1).....	J-26-1100
Saucer Eject (1).....	J-28-2300
Thumper-Bumper (3).....	J-26-1200
Sling-Shot (2).....	J-26-1500
Drop Target Reset (1).....	B-24-1600
Drop Target Reset (Each Target) (5).....	C1-34-3400

**MODULES**

Lamp Driver.....	B-431
Display Driver (5 Used).....	A-434
Solenoid Driver/Voltage Regulator.....	B-432
MPU.....	C-433-111
Rectifier Board.....	A-430
Sound Module.....	B-521

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