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CAPTAIN HOOK

INSTALLATION AND REPAIR MANUAL

MODEL 780

02-3002

INSTALLATION AND REPAIR MANUAL

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INSTALLATION

I. GENERAL INSTALLATION

Remove backbox, cabinet and legs from the shipping container. Bolts required for assembly, tilt ball and game ball are shipped inside the cashbox. Mount the legs to the cabinet. Pull the line cord through the hole in the cabinet and place it in the slot at rear of the cabinet. Place backbox on the cabinet and mount with the four bolts provided. Pull cables up through the hole in the bottom of the backbox and plug into mating connectors in backbox. Note the connectors are color coded to prevent connection errors. Connect ground braid to backbox shielding screw.

Check all connectors to ensure that none vibrated loose during shipping. Check playfield wiring and cabinet wiring for shipping damage. Check that all fuses are firmly in place. Adjust the leg levelers, check the tilt bob adjustment and insert roll-tilt ball. Lower the playfield, and place the game ball in the shooter alley.

Plug the game into a grounded outlet only of specified voltage. Do not remove the ground plug or use a cheater plug to defeat the grounding system.

The game is now ready to power up and check out. Refer to section IV, routine maintenance on location, for check out.

II. GENERAL GAME OPERATION

Turn on the on-off switch located under the cabinet near the right front leg. The displays should stay blank for approximately 7 seconds. During this time the MPU circuit board is exercising its self diagnostic routine, the game over tune will play and the displays will alternately flash the last game's scores and high score to date.

Coin the game. The game should play the coin sound and increment the credit display. Press the credit button. The start of game sound should play, the credit display should decrement, the first player should flash for the player up, ball in play 1 should be lit, and the ball should be served to the shooter alley if sitting in the ball return hole.

Pressing the credit button again will cause the number of players to be incremented with each depression to a maximum or four.

III. FEATURE OPERATION & SCORING

The A,B, & C lanes score 1,000 points or 3,000 points when lit. The A lane lights the left bumper. The B lane lights the spinner 1000 points lamp. The C lane lights the right bumper. Completing all three lanes scores an extra 10,000 points and bumps the bonus multiplier to the next position. This will continue until the bonus multiplier is at 5X and then a special outlane lamp will light if so optioned.

The 1234 drop targets each score 5,000 points. All down gives the associated flashing feature and flashes the left target 25,000 points lamp. These targets will remain down until reset from either the fixed target behind the drop targets or the left target.

The TAIN drop targets each score 5,000 points when lit and spots its letter in the bonus area. When unlit they score 1,000 points. All down gives the associated flashing feature and flashes the right target 25,000 points lamp. These targets will remain down until reset from either the fixed target behind the drop targets or the right target.

The thumper bumpers score 100 points or 1,000 points when lit. They are lit from the A and C lanes.

The spinner scores 100 points or 1,000 when lit for each revolution. It lights from the B lane.

The CAP targets score 5,000 points and spots their associated bonus letter. If unlit they score 1,000 points. If the spots letter lamp is flashing, hitting any of these targets will spot the next bonus letter needed to complete CAPTAIN HOOK.

The slingshots score 30 points & alternate the outlane special lamps if lit.

The left and right targets score 5,000 points or if flashing, 25,000 points and resets their respective drop targets.

The HOOK target scores the points indicated by the upper lit lamp or 20,000 points if none are lit. Is also moves the upper lit lamp down into the bonus collect area.

The left and right outlanes score 2,000 points and award a special if lit. Special lamps are lit, if optioned, from the ABC lanes.

The left and right return lanes score 2,000 points when lit or 1,000 points if unlit. Making both, while shooting the same ball, lights the spots letter lamp.

Bonus collect scores 5,000 points for each lit letter multiplied by any lit bonus multiplier. Bonus letters and multipliers are lost from one ball to the next unless saved due to the 1234 drop targets features. When all CAPTAIN HOOK bonus letters are made, they will turn off and light the next progression of the 55,000 or 110,000 or special lamps. These three lamps do carry over from one ball to the next. The special lamp turn on score is adjustable from set up switches # 6 and # 7.

Please note that the CAPTAIN HOOK game has (and all future Game Plan machines will have) a new software routine which we hope will eliminate the problem of giving away free games as a result of the replay levels stored in RAM being destroyed. This destruction of RAM information usually takes place from either problems in the MPU boards oscillator and reset circuits or shorted switches on the playfield. Should this new routine detect any unrealistic information in the RAM when tested on power up, an alarm will sound, all accounting meters will be set to zero, and all replay levels will be set to 9,999,990. The alarm will continue until either the game is shut off, or a coin is inserted.

Exceeding high score to date awards credits, if optioned, at the end of the game and the displayed high score to date is automatically updated.

Tilting the game results in loss of current ball and the flippers and all playfield features go dead. Slamming the machine results in loss of the the game, and the game goes into a delay mode for approximately 5 seconds. The kickout is always active except during this delay. If a ball falls in the kick-out hole during the slam delay it will be kicked out immediately after the delay.

At the end of the game, the game over tune plays and the match number shows in the ball play display if optioned. The game goes into a game over delay for approximately 5 seconds and then begins alternately flashing last game score and high score to date on the displays.

IV. ACCOUNTING FUNCTIONS

Note: The game must be in the gmae over mode before entering into the accounting routine. A new accounting reset button has been added to the coin door. It provides the same function as S-33 on the MPU board.

The accounting routines are entered by pressing the test switch inside the coin door. The number of the accounting function is shown in the ball in play display and the count for that function is shown on all four players displays. Continued pressing of that test switch will cause the game to cycle through all the accounting functions. If the game is left in one of the accounting functions, it will automatically return to game over after approximately 30 seconds.

Any accounting function can be reset by pressing S33 on the MPU board or by pressing the reset switch on the coin door. While that particular accounting function is being displayed.

Replay levels and high score to date are reset to 100,000 all other accounting functions are reset to zero.

The sequence of accounting functions are as follows:

1. Coin Counter #1
2. Coin Counter #2
3. Coin Counter #3
4. Total Plays
5. Total Replays (from match, replay levels, & new high score)

*6. Replay Level #1
*7. Replay Level #2
*8. Replay Level #3
*9. High Score to Date

10. Number of times high score to date has been exceeded
11. Number of credits on game
12. Number of times level #1 exceeded
13. Number of times level #2 exceeded
14. Number of times level #3 exceeded
.....Credit button.

*Reset to 100,000 by pressing reset switch on coin door or S-33 on MPU board, can be incremented 100,000 points for each depression of the credit button. Eliminating the 1st replay level eliminates all the replay levels because the 2nd level cannot be reached until the 1st level has been achieved, and the 3rd level cannot be reached until the 2nd level has been achieved.

V. GAME ADJUSTMENTS

A. PLAYFIELD ADJUSTMENTS

The left and right outlane openings are adjusted by moving the adjacent post back or forward in its slot. A smaller opening to the outlane will increase playing time and scoring.

B. VOLUME ADJUSTMENT

The volume control for the microprocessor sound unit is located on the Tilt Block assembly in the cabinet and may be accessed through the coin door. Turning the control clockwise increases volume, counter-clockwise decreases volume.

C. MPU SET UP SWITCHES

The MPU P.C. board has 32 set up switches that allow play to be customized to the location. The switches are contained in four switch packs numbered S1-8, S9-16, S17-24 and S25-32. Switch selectable options are credits per coin, tune options, maximum credits allowed, 3 or 5 balls per game option, replay of free ball award, match feature, and credits for exceeding high score.

CREDITS/COIN ADJUSTMENT

S9 through S12 select the credits per coin chute 2. Switch setting and resultant per coin as follows:

S12	S11	S10	S9	CREDITS/COIN
OFF	OFF	OFF	OFF	SAME AS COIN CHUTE # 1 SETTING
OFF	OFF	OFF	ON	1/1 COIN
OFF	OFF	ON	OFF	2/1 COIN
OFF	OFF	ON	ON	3/1 COIN
OFF	ON	OFF	OFF	4/1 COIN
OFF	ON	OFF	ON	5/1 COIN
OFF	ON	ON	OFF	6/1 COIN
OFF	ON	ON	ON	7/1 COIN
ON	OFF	OFF	OFF	8/1 COIN
ON	OFF	OFF	ON	9/1 COIN
ON	OFF	ON	OFF	10/1 COIN
ON	OFF	ON	ON	11/1 COIN
ON	ON	OFF	OFF	12/1 COIN
ON	ON	OFF	ON	13/1 COIN
ON	ON	ON	OFF	14/1 COIN
ON	ON	ON	ON	15/1 COIN

S1 through S5 select the credits per coin for chute 1. S17 through S21 select the credits per coin for coin chute 3. Switch setting and resultant credits per coin are identical for coin chutes 1 and 3 are as follows:

CREDITS/COIN ADJUSTMENTS

COIN CHUTE	SWITCHES					CREDITS/COIN
#1 ⟶	5	4	3	2	1	
#3 ⟶	21	20	19	18	17	
	OFF	OFF	OFF	OFF	OFF	3/2 COINS
	OFF	OFF	OFF	OFF	ON	3/2 COINS
	OFF	OFF	OFF	ON	OFF	1/ COIN
	OFF	OFF	OFF	ON	ON	1/2 COINS
	OFF	OFF	ON	OFF	OFF	2/ COIN
	OFF	OFF	ON	OFF	ON	2/2 COINS
	OFF	OFF	ON	ON	OFF	3/ COIN
	OFF	OFF	ON	ON	ON	3/2 COINS
	OFF	ON	OFF	OFF	OFF	4/ COIN
	OFF	ON	OFF	OFF	ON	4/2 COINS
	OFF	ON	OFF	ON	OFF	5/ COIN
	OFF	ON	OFF	ON	ON	5/2 COINS
	OFF	ON	ON	OFF	OFF	6/ COIN
	OFF	ON	ON	OFF	ON	6/2 COINS
	OFF	ON	ON	ON	OFF	7/ COIN
	OFF	ON	ON	ON	ON	7/2 COINS
	ON	OFF	OFF	OFF	OFF	8/ COIN
	ON	OFF	OFF	OFF	ON	8/2 COINS
	ON	OFF	OFF	ON	OFF	9/ COIN
	ON	OFF	OFF	ON	ON	9/2 COINS
	ON	OFF	ON	OFF	OFF	10/ COIN
	ON	OFF	ON	OFF	ON	10/2 COINS
	ON	OFF	ON	ON	OFF	11/ COIN
	ON	OFF	ON	ON	ON	11/2 COINS
	ON	ON	OFF	OFF	OFF	12/ COIN
	ON	ON	OFF	OFF	ON	12/2 COINS
	ON	ON	OFF	ON	OFF	13/ COIN
	ON	ON	OFF	ON	ON	13/2 COINS
	ON	ON	ON	OFF	OFF	14/ COIN
	ON	ON	ON	OFF	ON	14/2 COINS
	ON	ON	ON	ON	OFF	15/ COIN
	ON	ON	ON	ON	ON	15/2 COINS

BONUS SPECIAL LIGHT ON OPTION

When the bonus special lamp is lit, a special will be awarded upon completion of CAPTAIN HOOK bonus. Switches #6 and #7 determine when the bonus special lamp light.

BONUS SPECIAL LAMP ON	S6	S7
BEGINNING	ON	ON
55,000	OFF	ON
110,000	ON	OFF
165,000	OFF	OFF

FREE PLAY OPTION

The game has provision for allowing free play. When the free play is on, credits are decremented normally until 0 credits, then pressing the credit button puts 99 credits on the game and they continue to be decremented.

FREE PLAY	S8
YES	ON
NO	OFF

BACKGROUND SOUND OPTION

Switch #13 selects a background sound during game play

BACKGROUND SOUND	S13
YES	ON
NO	OFF

EXTRA BALL

S14 enables or disables the feature.

EXTRA BALL	S14
YES	ON
ON	OFF

BALLS PER GAME OPTION

# BALLS PER GAME	SWITCHES	
	24	23
5	ON	ON
3	ON	OFF
2	OFF	ON
1	OFF	OFF

MAXIMUM CREDITS

The maximum number of credits that will be accepted by the game either through the coin switch or replay award are controlled by S26 and 27. Switch settings are as follows.

MAXIMUM	SWITCHES	
CREDITS	27	26
10	OFF	OFF
20	OFF	ON
30	ON	OFF
40	ON	ON

REPLAY OR FREE BALL AWARD

The game is designed to award either a replay, free ball, 50,000 points, or no award at three selectable score levels or through specials gained during the play of the game.

AWARD	S29	S28
REPLAY	ON	ON
EXTRA BALL	ON	OFF
50,000 PTS	OFF	ON
NO AWARD	OFF	OFF

MATCH FEATURE

When the match feature is ON, a random number appears in the ball in play display at game over. A replay is awarded if the number matches the tens digit in a player's score.

MATCH	S30
YES	ON
NO	OFF

CREDITS FOR EXCEEDING HIGH SCORE

The game is designed to award replays for beating the previous high score to date. The winning score becomes the new high socre to date.

CREDITS	S32	S31
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

NUMBER OF EXTRA BALL REMEMEBER OPTION

Switch #22 selects how many extra balls are saved in the memory.

EXTRA BALLS REMEMBERED	S22
0	OFF
1	ON

"TAIN" EXTRA BALLS PER GAME OPTION

Switch #15 selects how many extra balls are permitted during the course of a game from completing the "TAIN" drop targets.

EXTRA BALLS PER GAME	S15
1	OFF
UNLIMITED	ON

"1234" EXTRA BALLS PER GAME OPTION

Switch #16 selects how many extra balls are permitted during the course of a game from completing the "1234" drop targets.

EXTRA BALLS PER GAME	S16
1	OFF
UNLIMITED	ON

SPOTS LETTER LAMP OPTION

Switch #25 selects whether or not the spots letter lamp turns off as CAPTAIN HOOK is completed.

SPOTS LETTER LAMP	S25
TURNS OFF	OFF
STAYS ON	ON

VI. ROUTINE MAINTENANCE ON LOCATION

The game is equipped with two separate diagnostic programs to aid in routine maintenance. The first test occurs automatically at power build up. The MPU board goes into its self-test routine, and upon successful completion plays the game over tune.

The second diagnostic program is accessed by depressing the test switch inside the front cabinet door.

NOTE: THE GAME MUST BE IN THE GAME OVER MODE.

1. Depress the test switch fifteen times to access the diagnostic routine. The score display will extinguish and all feature lamps will flash. Check for burned out lamps at this time.

2. Depress the test switch again to start the score display check-out. All digits except the units digits will count through 1-9.

3. Depress the test switch again to begin the solenoid checkout. Each solenoid will actuate individually and show its number on the score displays. Refer to table 1 of repair section for solenoid numbers.

4. Depress the test switch again to start the switch checkout. Any closed switch will show its number on the score display. Refer to table 2 of the repair section for switch numbers.

NOTE: THE BALL SHOULD NOT BE IN THE OUTHOLE DURING THIS TEST.

Depressing the test switch again puts the game back in the game over mode. The diagnostic routine should be exercised on a regular basis to ensure proper operation of the game.

REPAIR

I. INTRODUCTION

Repair of the game on location is by printed circuit board, solenoid, switch, or lamp replacement, or by cable harness repair. No special tools or equipment are required other than a standard soldering iron, hand tools and volt/ohmmeter.

Troubleshooting faults in the game is aided by the use of the two built in diagnostic routines. The first test is initiated automatically at power up as the MPU board exercises its self diagnostic routine. As each section of the MPU board is checked, the red LED located near the top of the board flashes for successful completion of each test. After six flashes, the game over tune plays to indicate correct MPU operation.

The second diagnostic program is entered by pressing the test switch inside the front cabinet door. Pressing the test switch 15 times will step through all the accounting functions and put the game into the diagnostic program. All feature lamps should flash. Pressing the test switch again causes the display to sequence from 0 through 9. Pressing the switch again causes all the solenoids to sequence. Refer to table 1 for solenoid numbers. Pressing the switch again causes closed switch to be displayed. Refer to table 2 for switch numbers. Pressing the test switch again will put the game back in the game over mode.

II. MODULE REPLACEMENT DIAGNOSTICS

SYMPTOM 1. Power up LED does not flash 6 times. General illumination lamps do not light.

	CAUSE	PROCEDURE
A.	Power Supply Incorrect	Refer To Power Supply Diagnostics.

SYMPTOM 2. Power up LED does not flash 6 times. General illumination lamps do light.

	CAUSE	PROCEDURE
A.	+5V Incorrect	Measure +5V ± .25V at TP1 of MPU board. If incorrect refer to power supply diagnostics.
B.	24VDC Incorrect	Measure 24VDC ± 6V at J1-3 of MPU Board. If incorrect refer to power supply diagnostics. If correct replace MPU Board.

SYMPTOM 3. Power up LED flashes 6 times, game over tune does not play correctly.

	CAUSE	PROCEDURE
A.	Incorrect output from MPU Board.	Replace MPU Board
B.	Faulty Sound Board	Replace Sound Board

SYMPTOM 4. One or more but less than 15 feature lamps do not light.

	CAUSE	PROCEDURE
A.	Burned Out Bulb	Replace bulb
B.	Faulty lamp driver board	Replace lamp driver board

SYMPTOM 5. More than 15 lamps do not light.

	CAUSE	PROCEDURE
A.	Faulty Lamp Driver Board	Replace Lamp Driver Board

SYMPTOM 6. One display board shows incorrect data during sequencing.

	CAUSE	PROCEDURE
A.	Faulty Display Board	Replace Display Board
B.	Faulty MPU Board Output	Replace MPU Board

SYMPTOM 7. All display boards show incorrect data during sequencing.

	CAUSE	PROCEDURE
A.	Faulty MPU Board Output	Replace MPU Board

SYMPTOM 8. One solenoid does not operate.

	CAUSE	PROCEDURE
A.	Faulty Solenoid	Replace Solenoid
B.	Faulty Solenoid Driver Board	Replace Solenoid Driver

SYMPTOM 9. More than one solenoid does not operate.

	CAUSE	PROCEDURE
A.	Faulty Solenoid Driver Board	Replace Solenoid Driver Board
B.	Faulty MPU Board Output	Replace MPU Board

SYMPTOM 10. None of the solenoids operate.

	CAUSE	PROCEDURE
A.	+24V missing at solenoids	Check +24V at solenoids

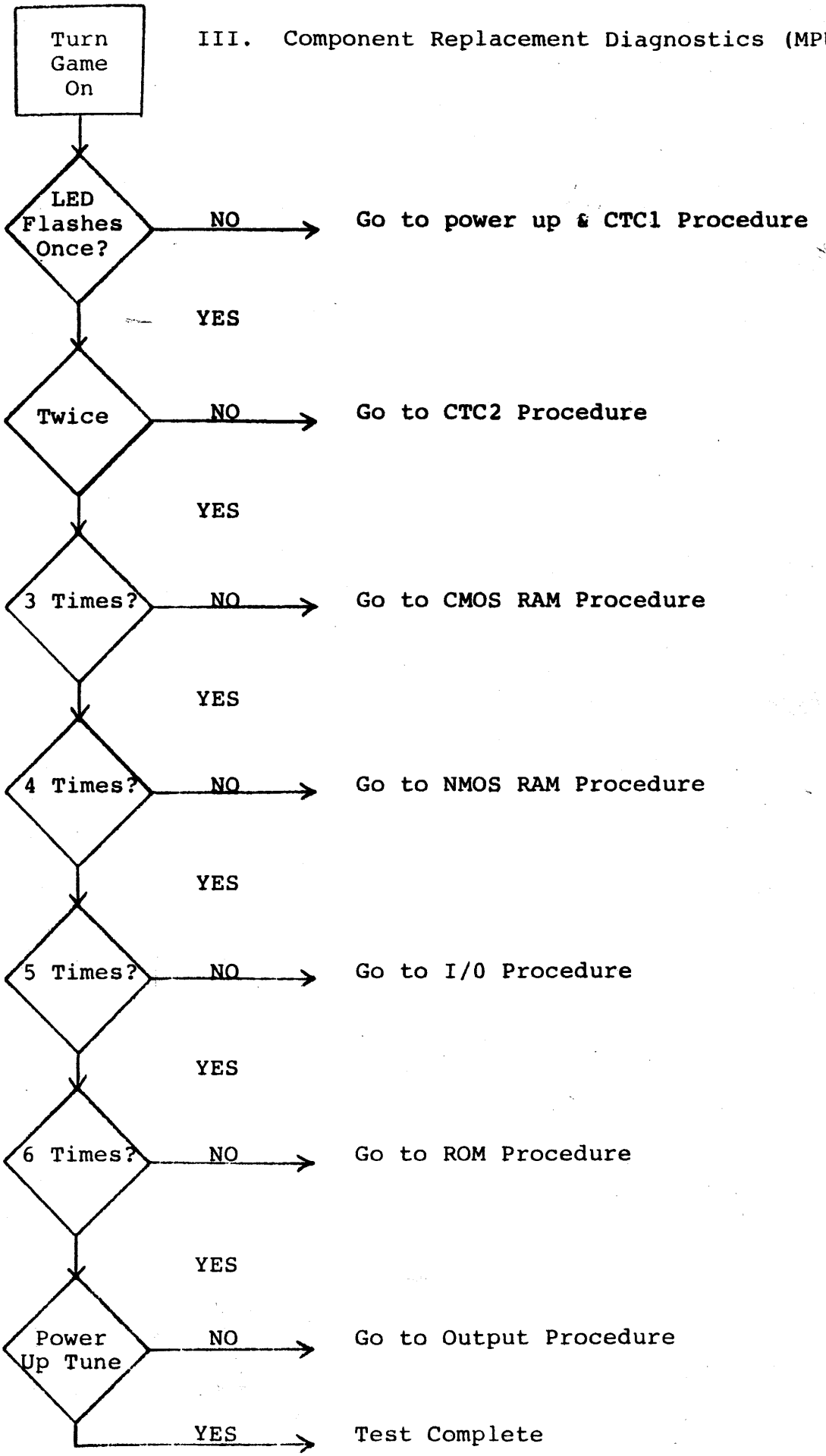
If incorrect look for broken wire between +24V at power supply and solenoids and refer to power supply diagnostics.

	CAUSE	PROCEDURE
B.	+5V missing at solenoid driver board	Check +5 at solenoid driver board. If incorrect look for broken wire between +5V at power supply and solenoid driver board.
C.	Faulty solenoid driver board	Replace solenoid driver Board

SYMPTOM 11. Switch always closed.

	CAUSE	PROCEDURE
A.	Stuck Switch	Locate switch from switch identification table and repair or replace switch.

III. Component Replacement Diagnostics (MPU Board)



COMPONENT REPLACEMENT

A. Power Up and CTC1 Procedure

CAUSE	PROCEDURE
+5V Incorrect	Measure +5V ± .25V at TP1 of MPU board. If incorrect refer to power supply diagnostics.
+24VDC Incorrect	Measure +24VDC ± 6V at J1-3 of MPU board. If incorrect refer to power supply diagnostics.
Reset Incorrect	1. Check for positive reset pulse at pin 35 of U17. If incorrect and negative reset pulse is present at TP4, replac QC. If no negative reset pulse is present at TP4, trace back through QD, QA, QB, U5 and U3 for defect. 2. Check for negative reset pl at pin 17 of U10 and pin 26 of If one or both are incorrect an negative reset pulse is present TP4, look for open or shorted f run.

		If both are incorrect and no negative reset pulse present at TP4, trace back through QD, QA, QB, U5 and U3 for defect.
D.	Oscillator Incorrect	Check TP5 for a square wave with a period of about 400ns. If Incorrect trace back through U3 to the crystal.
E.	LED Circuit Defective	Check for positive pulse at base of QE. If present replace QE. If operation still incorrect replace LED.
F.	U10, U11, U17, U6, U7, U8, U12, U13, U26, U24, U25, U4, U3, or U9 defective.	Replace one at a time with known good parts until fault is cleared.

CTC2 PROCEDURE

CAUSE	PROCEDURE
CTC zero cross over input incorrect.	Check pin 21 or U10 for positive zero cross over pulse. If incorrect trace back through U3 and U2.
U10 Defective	Replace U10 with known good I.C.

U3 Defective	Replace U3 with a known good I.C.
U11, U6, U7, U8, U12, U13, U26 or U17 defective	Replace one at a time with known good parts until fault is cleared.

C. CMOS RAM Procedure

CAUSE	PROCEDURE
CMOS RAM Defective	Replace U6 and U7, one at a time.
CMOS Gate Defective	Replace U9.

D. NMOS RAM Procedure

CAUSE	PROCEDURE
NMOS RAM Defective	Replace U8
NMOS RAM Chip Select Defective	Replace U5 and U24, one at a Time.

E. I/0 Procedure

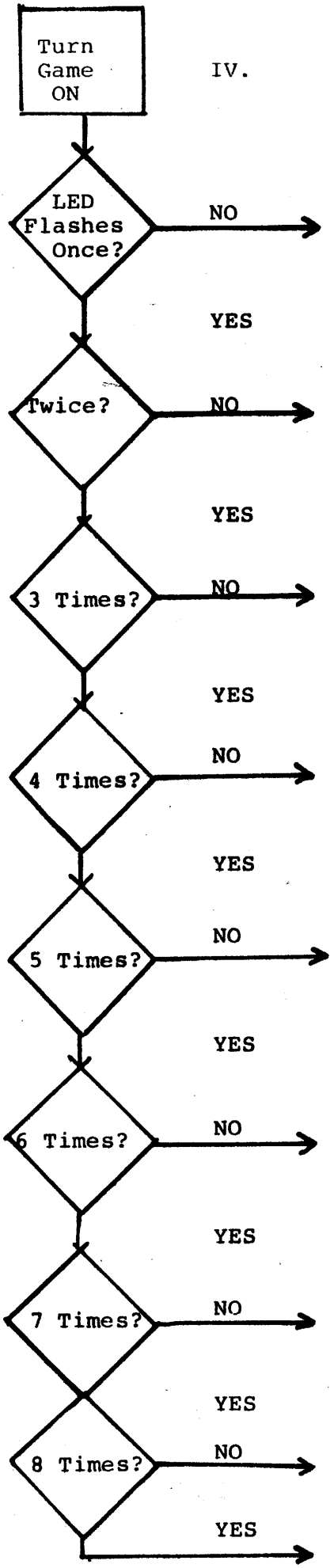
CAUSE	PROCEDURE
I/0 Defective	Replace U17
I/0 chip select gate defective	Replace U4

F. ROM Procedure

CAUSE	PROCEDURE
ROM Defective	Replace U12, U13 and U26, one at a time

G. OUTPUT PROCEDURE

CAUSE	PROCEDURE
U14, U16, U20, U21, U15, U19, U22, U18 or U23 Defective	Replace on at a time with known good parts.



IV. Component Replacement Diagnostics (MSU Board)

Go to Power up & Reset procedure

Go to Power up & Reset procedure

Go to ROM2 procedure

Go to ROM1 procedure

Go to RAM procedure

Go to Interrupt procedure

Go to PIA1 procedure

Go to PIA2 procedure

Test Complete

A. Power Up and Reset Procedure

CAUSE	PROCEDURE
+12V Incorrect	Check for +12V ± 2V At TP4. If incorrect refer to power supply diagnostics.
+5V Incorrect	Check for +5V ± .25V at TP3. If incorrect refer to power supply diagnostics.
LED Circuit Defective	If LED is out: Ground Pin 8 of U16. If LED does not turn on replace LED. If LED is on: check logic level at Pin 9 of U16. If low replace U16.
Reset Incorrect	Check TP2 for negative going pulses at ~10Hz Rate. If pulses present replace U6. If reset still not correct replace U9, then U7. If still incorrect check for shorted data or address lines, If no pulse at TP2 check logic level at Pin 4 of U4. If high replace U8. If low replace U4.
Clock Oscillator Incorrect	Check TP6 For~900Hz Square wave. If not present replace U6. If still not correct replace crystal.

B. ROM2 Procedure

CAUSE	PROCEDURE
Defective ROM Chip	Replace U1Ø
Address Decoder Defective	Replace U7

C. ROM 1 Procedure

CAUSE	PROCEDURE
Defective ROM Chip	Replace U9
Address Decoder Defective	Replace U7

D. RAM Procedure

CAUSE	PROCEDURE
Defective RAM Chip	Replace U8
Address Decoder Defective	Replace U7

E. Interrupt Procedure

CAUSE	PROCEDURE
Oscillator Defective	Check for negative going pulses (400Hz Rate) at TP5. If no pulses present replace U1.
PIA1 Defective	Check for pulses at Pin 18 of U5. If present replace U5.

F. PIA1 Procedure

CAUSE	PROCEDURE
Improper Input from MPU	Unplug J1 of MSU board. If problem corrected refer to MPU diagnostics.
PIA Defective	Replace U5
Address Decoder Defective	Replace U7

G. PIA 2 Procedure

CAUSE	PROCEDURE
PIA Defective	Replace U12
Address Decoder Defective	Replace U7

V. Power Supply Diagnostics

CAUTION: The power supply contains dangerous voltage levels. Use extreem caution while troubleshooting.

SYMPTOM 1. +5V incorrect, +12V incorrect

CAUSE	PROCEDURE
Defective +5V regulator	Change LM323 with known good.

SYMPTOM 2. +5V incorrect, +12V incorrect

CAUSE	PROCEDURE
Fuse Blown (+12V)	Replace fuse check 10.5 VAC input to bridge. If correct, replace bridge with known good If +5 and +12V still do not co up, replace 11,000 MF Capacito
Defective Bridge	

SYMPTOM 3. +5and +12V correct
+24V incorrect.

CAUSE	PROCEDURE
Fuse Blown (28VAC) on power supply defective bridge.	Replace fuse check 28VAC. If correct replace bridge with known good part.
Playfield fuse blown	Replace Fuse.

SYMPTOM 4. +5, +12, +24V correct, +7V incorrect

CAUSE	PROCEDURE
Fuse Blown (8VAC)	Replace Fuse.
defective bridge	Check 8 VAC. If correct, replace bridge with known good part.

SYMPTOM 5. AC voltage incorrect on one or more, but not all secondary windings.

CAUSE	PROCEDURE
Defective Transformer Winding	Remove fuse from defective secondary. If voltage still incorre replace transformer. If voltage comes up, disconnect all PC boards that the winding goes to, reinsert fuse and plug PC boards back until defect reappears.

SYMPTOM 6. No secondary AC voltage at transformer, primary voltage correct.

CAUSE	PROCEDURE
Defective Transformer	Replace with known good transformer.

VI. SOLENOID AND SWITCH IDENTIFICATION

A. TABLE 1.

SOLENOID IDENTIFICATION

The solenoid checkout section of the diagnostic routine actuates each solenoid on the playfield. The solenoid number is shown in each display as the solenoid is being actuated. The following list identifies each solenoid by number:

Ball Return	01
1234 Targets	02
Left Bumper	03
Right Bumper	04
Tain Targets	05
Left Slingshot	06
Right Slingshot	07
Knocker *	08
Coin Lockout *	09
Flipper Relay Enable	10
Feature Lamps On	11
Feature Lamps Off	12

* Optional

SWITCH IDENTIFICATION

B. TABLE 2

In the switch checkout section of the diagnostic routine the number of the closed switch is shown in each display. Closing any switch causes its number to be displayed. The following list identifies each switch by number.

SWITCH FUNCTION	
None Closed	00
Accounting Reset	01
Credit Button	02
Slam Switch	03
Spinner	04
Coin Chute 2	05
Coin Chute 3	06
Coin Chute 1	07
Tilt Switch	08
Right Slingshot	09
Left Slingshot	10
Ball Return	11
10 Point	12
Drop Target 1	13
Drop Target 2	14
Drop Target 3	15
Drop Target 4	16
C Target	17
A Target	18
P Target	19
T Drop Target	20
A Drop Target	21
I Drop Target	22
N Drop Target	23
Hook Target	24
Lane Change	25
Diagnostic and Accounting	26
Not Used	27
Right Spec Lane	28
Left Special Lane	29
A Lane	30
B Lane	31
C Lane	32
Left Target	33
Right Target	34
Left Bumper	35
Right Bumper	36
Right Return Lane	37
Left Return Lane	38

CAPTAIN HOOK
ACCOUNTING FUNCTIONS

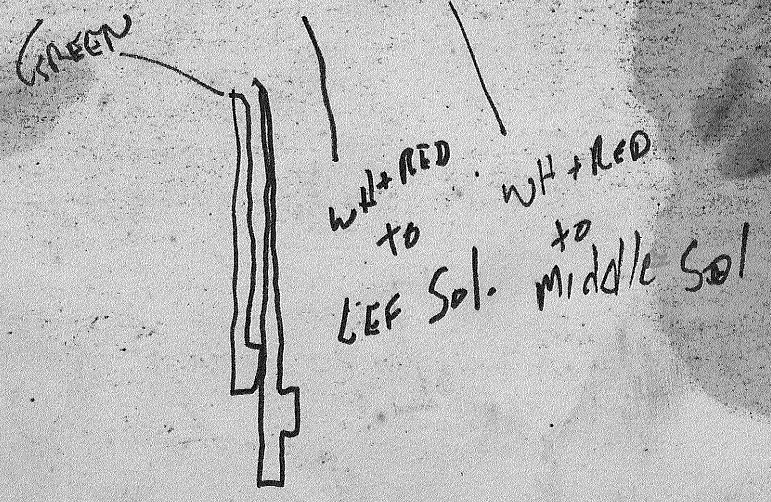
NOTE: THE GAME MUST BE IN THE GAME OVER MODE BEFORE ENTERING INTO THE ACCOUNTING ROUTINES.

THE SEQUENCE OF ACCOUNTING FUNCTIONS ARE AS FOLLOWS:

1. Coin Counter # 1
2. Coin Counter # 2
3. Coin Counter # 3
4. Total Plays
5. Total Replays (from match, replay levels, & new high score)
*6. Replay Level # 1
*7. Replay Level # 2
*8. Replay Level # 3
*9. High Score to Date
10. Number of times high score to date has been exceeded
11. Number of credits on game

* Reset to 100,000 by pressing S33 on MPU board, or reset button switch on coin door can be incremented 100,000 points for each depression of the credits butto

12. Number of times level 1 exceeded.
13. Number of times level 2 exceeded.
14 Number of times level 3 exceeded.
15. Feature lamp diagnostic routine
16. Score display checkout diagnostic routine
17. Solenoid diagnostic routine (see table # 1)
18. Switch checkout diagnostic routine (see table # 2)



CAPTAIN HOOK

SOLENOID AND SWITCH IDENTIFICATION

TABLE 1

BALL RETURN..... 01
1234 TARGETS..... 02
LEFT BUMPER..... 03
RIGHT BUMPER..... 04
TAIN TARGETS..... 05
LEFT SLINGSHOT..... 06
RIGHT SLINGSHOT..... 07
KNOCKER *..... 08
COIN LOCKOUT *..... 09
FLIPPER RELAY ENABLE..... 10
FEATURE LAMPS ON..... 11
FEATURE LAMPS OFF..... 12

* OPTIONAL

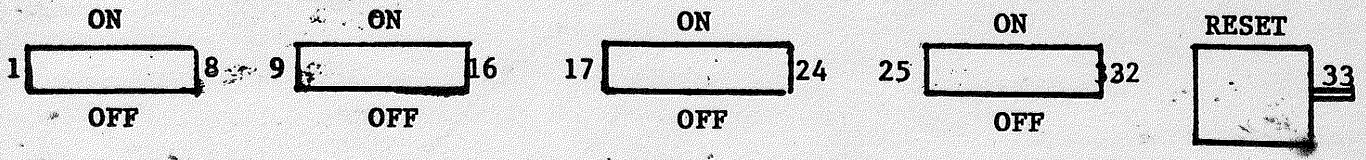
SWITCH FUNCTION

TABLE 2

NONE CLOSED..... 00
ACCOUNTING REST..... 01
CREDIT BUTTON..... 02
SLAM SWITCH..... 03
SPINNER..... 04
COIN CHUTE 2..... 05
COIN CHUTE 3..... 06
COIN CHUTE 1..... 07
TILT SWITCH..... 08
RIGHT SLINGSHOT..... 09
LEFT SLINGSHOT..... 10
OUTHOLE..... 11
10 POINT..... 12
DROP TARGET 1..... 13
DROP TARGET 2..... 14
DROP TARGET 3..... 15
DROP TARGET 4..... 16
C TARGET..... 17
A TARGET..... 18
P TARGET..... 19
T DROP TARGET..... 20
A DROP TARGET..... 21
I DROP TARGET..... 22
N DROP TARGET..... 23
HOOK TARGET..... 24
LANE CHANGE..... 25
TEST..... 26
NOT USED..... 27
RIGHT SPEC LANE..... 28
LEFT SPEC LANE..... 29
A LANE..... 30
B LANE..... 31
C LANE..... 32
LEFT TARGET..... 33
RIGHT TARGET..... 34
LEFT BUMPER..... 35
RIGHT BUMPER..... 36
RIGHT RETURN LANE..... 37
LEFT RETURN LANE..... 38

CAPTAIN HOOK

MPU SET UP SWITCH ADJUSTMENTS



EXTRA BALL OPTION
- YES
- NO

SWITCH # 14
- ON
- OFF

EXCEEDING SOORE LEVELS
- NO AWARDS
- 50,000 PTS.
- EXTRA BALL
- REPLAY

SWITCHES # 29 & # 28
- OFF OFF
- OFF ON
- ON OFF
- ON ON

MAXIMUM CREDITS
- 10
- 20
- 30
- 40

SWITCHES # 27 & # 26
- OFF OFF
- OFF ON
- ON OFF
- ON ON

BALLS PER GAME
- 1
- 2
- 3
- 5

SWITCHES # 24 & # 23
- OFF OFF
- OFF ON
- ON OFF
- ON ON

MATCH
- YES
- NO

SWITCH # 30
- ON
- OFF

FREE PLAY
- YES
- NO

SWITCH # 28
- ON
- OFF

HIGH SCORE CREDITS
- 0
- 1
- 2
- 3

SWITCH # 31 & # 32
- OFF OFF
- ON OFF
- OFF ON
- ON ON

BONUS SPECIAL LAMP ON
- BEGINNING
- 55,000
- 110,000
- 165,000

SWITCH # 6 && # 77
- ON ON
- OFF ON
- ON OFF
- OFF OFF

CREDIT /COIN ADJUSTMENTS

COIN CHUTE	SWITCHES					CREDITS/COIN
# 1 →	5	4	3	2	1	
# 3 →	21	20	19	18	17	
	OFF	OFF	OFF	OFF	OFF	3/2 COINS
	OFF	OFF	OFF	OFF	ON	3/2 COINS
	OFF	OFF	OFF	ON	OFF	1/ COIN
	OFF	OFF	OFF	ON	ON	1/2 COINS
	OFF	OFF	ON	OFF	OFF	2/COIN
	OFF	OFF	ON	OFF	ON	2/2 COINS
	OFF	OFF	ON	ON	OFF	3/ COIN
	OFF	OFF	ON	ON	ON	3/2 COINS
	OFF	ON	OFF	OFF	OFF	4/ COIN
	OFF	ON	OFF	OFF	ON	4/2 COINS
	OFF	ON	OFF	ON	OFF	5/ COIN
	OFF	ON	OFF	ON	ON	5/2 COINS
	OFF	ON	ON	OFF	OFF	6/ COIN
	OFF	ON	ON	OFF	ON	6/2 COINS
	OFF	ON	ON	ON	OFF	7/ COIN
	OFF	ON	ON	ON	ON	7/2 COINS
	ON	OFF	OFF	OFF	OFF	8/ COIN
	ON	OFF	OFF	OFF	ON	8/2 COINS
	ON	OFF	OFF	ON	OFF	9/ COIN
	ON	OFF	OFF	ON	ON	9/2 COINS
	ON	OFF	ON	OFF	OFF	10/ COIN
	ON	OFF	ON	OFF	ON	10/2 COINS
	ON	OFF	ON	ON	OFF	11/ COIN
	ON	OFF	ON	ON	ON	11/2 COINS
	ON	ON	OFF	OFF	OFF	12/ COIN
	ON	ON	OFF	OFF	ON	12/2 COINS
	ON	ON	OFF	ON	OFF	13/ COIN
	ON	ON	OFF	ON	ON	13/2 COINS
	ON	ON	ON	OFF	OFF	14/ COIN
	ON	ON	ON	OFF	ON	14/2 COIN
	ON	ON	ON	ON	OFF	15/ COIN
	ON	ON	ON	ON	ON	15/2 COINS

COIN CHUTE					
#2 →	S12	S11	S10	S9	CREDITS/COIN
	OFF	OFF	OFF	OFF	SAME AS COIN CHUTE # 1 SETTING
	OFF	OFF	OFF	ON	1/1 COIN
	OFF	OFF	ON	OFF	2/1 COIN
	OFF	OFF	ON	ON	3/1 COIN
	OFF	ON	OFF	OFF	4/1 COIN
	OFF	ON	OFF	ON	5/1 COIN
	OFF	ON	ON	OFF	6/1 COIN
	OFF	ON	ON	ON	7/1 COIN
	ON	OFF	OFF	OFF	8/1 COIN
	ON	OFF	OFF	ON	9/1 COIN
	ON	OFF	ON	OFF	10/1 COIN
	ON	OFF	ON	ON	11/1 COIN
	ON	ON	OFF	OFF	12/1 COIN
	ON	ON	OFF	ON	13/1 COIN
	ON	ON	ON	OFF	14/1 COIN
	ON	ON	ON	ON	15/1 COIN

NUMBER OF EXTRA BALLS REMEMBERED	SWITCH # 22
0	OFF
1	ON
"TAIN" EXTRA BALLS PER GAME	SWITCH # 15
1	OFF
UNLIMITED	ON
"1234" EXTRA BALLS PER GAME	SWITCH # 16
1	OFF
UNLIMITED	ON
SPOTS LETTER LAMP	SWITCH # 25
TURNS OFF	OFF
STAYS ON	ON