GAME PLAN, INC.

COCKTAIL PINBALL

(MODEL 120)

INSTALLATION

AND

REPAIR MANUAL

02-30015N
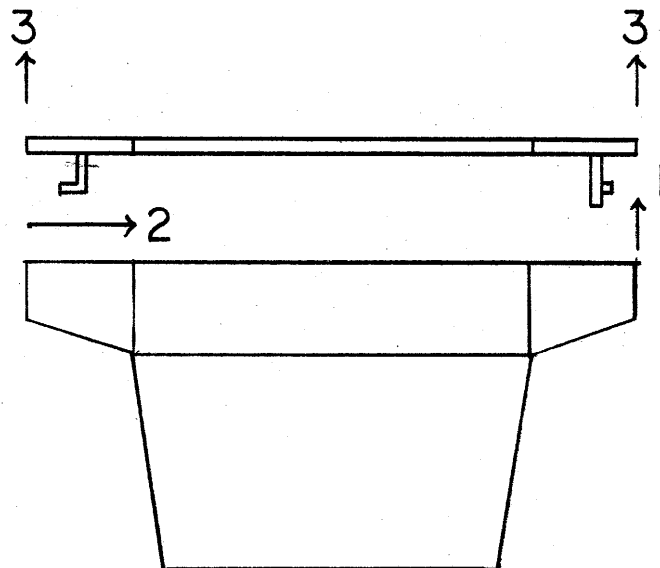
1. UNLOCK AND LIFT BACK OF TOPGLASS.

2. SLIDE TOPGLASS TOWARD REAR OF GAME
   UNTIL FRONT BRACKET IS CLEAR.

3. LIFT FRONT AND BACK UNTIL CLEAR OF GAME.

FIGURE 1. TOPGLASS REMOVAL

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INSTALLATION

I GENERAL INSTALLATION

The game is shipped with the game ball, tilt ball and four legs inside the cash box. The keys for the door lock, top glass lock, and cash box locks are attached to the ball shooter. The following steps are necessary to make the game ready for play:

1. Attach the four legs to the bottom of the game by screwing them into their mounting brackets. Level the game by adjusting the hex nut on the legs.

2. Unlock the top glass and remove the glass by lifting the back, then sliding the top toward the back of the game and up as in figure #1. Raise the playfield by lifting on the bracket above the ball return hole and rest it on the playfield support arm.

3. Insert the tilt ball into the roll tilt assembly in the upper left corner of the cabinet.

4. Check the adjustment of the plumb bob tilt.

5. Check that all cable connectors are completely seated and clear of moving parts.

6. Check for any broken or disconnected wires.

7. Check the playfield for any shorts between lamp sockets, switch contacts or solenoids that may have been caused by vibration during shipment.

8. Check that fuses are firmly in place.

9. Check the power supply for any foreign material that may have fallen into it during shipment.

Lower the playfield and put the game ball in the shooter alley. Put the top glass back on and lock it. The game is now ready to be plugged in. Plug only into voltage as specified on label on rear of game.

II   GENERAL GAME OPERATION

Turn on the ON-OFF switch located at the rear of the game above the line cord. The displays should stay blank for approximately 7 seconds. During this time the MPU circuit board is exercising its self diagnostic routine. Upon successful completion of the self diagnostic routine, the game over tune will play and the displays will alternately flash zeros and high score to date.

Coin the game. The game should play the coin tune if selected and increment the credit display. Press the credit button. The start of game tune should play if selected, the credit display should decrement, the first player display should flash for player up, ball in play and number of players display should be at 1, 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 of four.

The rollovers at the top and either side of center on the playfield increment the score by 1000 points and advance the bonus by 1000 points. Spinner lane rollover lites spinner. The spinner scores 100 or 1000 when lit. The left and right thumpers score 100 points. The upper, left, and right slingshots and bumpers score 10 points. Kickout hole collects bonus and scores 5000 points. Drop targets score 1000 each plus 10,000 points for dropping all three, dropping targets each time after scores 5000 each plus 10,000 points for all three. The 'A' lane scores 1,000 and 5,000 points when lit also lite 'extra' out lane. The 'B' lane scores 500 and 5000 points when lit. The 'C' lane scores 100 and 1000 points when lit. The 'D' lane scores 50 and 500 when lit also lites special out lane. The E, F, G and H score 100 and and 1000 when lit. Extra lane scores extra ball when lit. Special lane scores special pro-grammable award when lit. All lanes advance bonus 1000 points.

Making features advances bonus multiplier, B and C for 2X, 3 drop targets for 3X, E and F for 4X and G and H for 5X. All bonus for current ball is collected when the ball falls in the out hole. When an extra ball is awarded it is played immediately following the ball that won it.

Exceeding high score to date awards credits, if optioned, at the end of the game and the displayed high score to date is auto-matically 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 game, and the game goes into a delay mode for approximately 15 seconds. The kickout is always

active except during this delay. If a ball falls in the kickout hole during the slam delay it will be kicked out immediately after the delay.

At the end of the game, the game over turn plays and the match number shows in the ball in play/number of players 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

The accounting routine begins at step 5 of the diagnostic and accounting program. Depressing the test switch 5 times will cause the first replay level to be displayed on all four score displays and 05 to show on the match display. The replay levels and all other accounting fucntions may be reset to zero as they are displayed by pressing the accounting reset button S33 on the MPU board. The replay level may be incremented by 2000 points for each depression of the credit button.

Depressing the test switch again will display the second replay level and 06 in the match window. This level may be adjusted by pressing the credit switch.

Depressing the test switch again will display the third replay level and 07 will show in the match window. This level may be adjusted by pressing the credit switch.

Depressing the test switch again will display the high score to date and show 08 in the match window. This level may be adjusted by pressing the credit switch.

Depressing the test switch again will display the current credits sotred in the game and show 09 in the match window. Example: 000120 = 12 credits. Remember the units digits on the score displays always show 0.

Depressing the test switch again will display the total plays and show 10 in the match window. To determine the number of total plays subtract 10,000 from the number displayed. Example: 010250 = 25 total plays.

Depressing the test switch again will display the total replays and show 11 in the match window. To determine the number of total replays subtract 10,000 from the number displayed. Example: 010450 = 45 replays.

Depressing the test switch again will display the total number of times the high score to date is beaten and 12 will show in the match window. Example: 000080 = 8 times.

Depressing the test switch again will display the total coins dropped through coin chute #1 and show 13 in the match window. To determine the total number of coins dropped through chute #1, subtract 10,000 from the number displayed. Example: 011140 = 114 coins.

Depressing the test switch again will display the total coins dropped through coin chute #2 and show 14 in the match window. To determine the total number of coins dropped through chute #2, subtract 10,000 from the number displayed. Example: 010000 = 0 coins.

Depressing the test switch again will display the total coins dropped through coin chute #3 and show 15 in the match window. To determine the total number of coins dropped through chute #3, subtract 10,000 from the number displayed. Example: 013650 = 365 coins.

Depressing the test switch one more time will return the game to game over and the game is now ready for play. Total plays, Total replays, Coin Chute 1, Coin Chute 2, and Coin Chute 3 are set to 010000 at the factory and may be reset to zero by S33.

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. 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 option, maximum credits allowed, 3 or 5 balls per game option, replay or free ball award, match feature, and credits for exceeding high score.

CREDITS/COIN ADJUSTMENT

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

S12	S11	S10	S9	CREDITS/COIN
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings
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 coin chute 1.
S17 through S21 select the credits per coin for coin chute 3.
Switch settings and resultant credits per coin are identical for
coin chutes 1 and 3 and are as follows:

CREDITS/COIN ADJUSTMENTS

COIN CHUTE	SWITCHES					CREDITS/COIN
#1	5	4	3	2	1	
or #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	ON	ON	10/2 COINS
	ON	OFF	ON	ON	OFF	11/COIN
	ON	OFF	ON	OFF	ON	11/2 COINS
	ON	ON	OFF	OFF	OFF	12/COIN
	ON	ON	OFF	ON	ON	12/2 COINS
	ON	ON	OFF	ON	OFF	13/COIN
	ON	ON	OFF	OFF	ON	13/2 COINS
	ON	ON	ON	OFF	OFF	14/COIN
	ON	ON	ON	ON	ON	14/2 COINS
	ON	ON	ON	ON	OFF	15/COIN
	ON	ON	ON	ON	ON	15/2 COINS

FREE PLAY OPTION

The game has provision for allowing free play. When the free play switch 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
ON	ON
OFF	OFF

TUNE OPTION

The game is designed to play a tune for each credit incremented from the coin switch, start of game, and power up/game over. The first two tunes are selectable by S16, however the power up/game over tune is always enabled. When the tune switch is off, the coin and start of game tunes are replaced by a single chime.

TUNES	S16
ON	ON
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 S25, 26, and 27. Switch settings are as follows:

MAXIMUM CREDITS	SWITCHES 27	26	25
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

BALLS PER GAME OPTION

#BALLS PER GAME	S28
5	ON
3	OFF

REPLAY OR FREE BALL AWARD

The game is designed to award either a replay or free ball at three selectable score levels or through specials gained during the play of the game.

AWARD	S29
REPLAY	ON
EXTRA BALL	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
ON	ON
OFF	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 score to date.

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

VI. ROUTINE MAINTENANCE ON LOCATION

The game is equipped with two deparate diagnostic programs to aid in routine maintenance. The first test occurs automatically at power up. The MPU board goes into its self-test routine, and upon sucessful 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 one time. 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 checkout. All digits except the units digits will count through 0-9.

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. It is normal for one chuck-a-luck output switch to always be closed. Refer to table 2 of repair section for switch numbers.

NOTE: The ball should not be in the outhole during this test.

Depressing the test switch 12 more times puts the game back in the game over mode. The diagnostic routine should be exercised several times a week 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 standard soldering and 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 once causes all feature lamps to flash. Pressing the test switch a second time causes the display to sequence from 0 through 9. Pressing the test switch a third time causes all the solenoids to sequence. Refer to table 1 for solenoid numbers. Pressing the switch a fourth time causes any closed switch to be displayed. It is normal for one of the chuck-a-luck output switches to be closed. Any other switch closed will override it. Refer to table 2 for switch numbers. Pressing the test switch 12 more times 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 $\overset{+}{-}$ .25V at TP1 of MPU Board. If incorrect refer to Power Supply diagnostics.
B. 24VDC incorrect	Measure 24VDC $\overset{+}{-}$ 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 solenoid driver board.	Replace solenoid driver board.

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

Cause	Procedure
A. Burned out bulb	Replace bulbs
B. Faulty lamp driver board	Replace lamp driver board.

Symptom 5.   More than 15 feature 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.   Both 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 board.

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.
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 other than chuck-a-luck output switch closed.

Cause   Procedure

A. Stuck switch   Locate switch from switch identi-
                                        fication table and repair or
                                        replace switch.

III. Component Replacement Diagnostics (MPU Board)

Turn Game On

Led Flashes Once? — No → Go to power up & CTC1 procedure

Yes ↓

Twice — No → Go to CTC2 procedure

Yes ↓

3 times? — No → Go to CMOS RAM procedure

Yes ↓

4 times? — No → NMOS RAM TEST - No NMOS RAM installed in this model - count flashes again

Yes ↓

5 times? — No → Go to I/O procedure

Yes ↓

6 times? — No → Go to ROM procedure

Yes ↓

Power Up Tune? — No → Go to output procedure

Yes → Test Complete
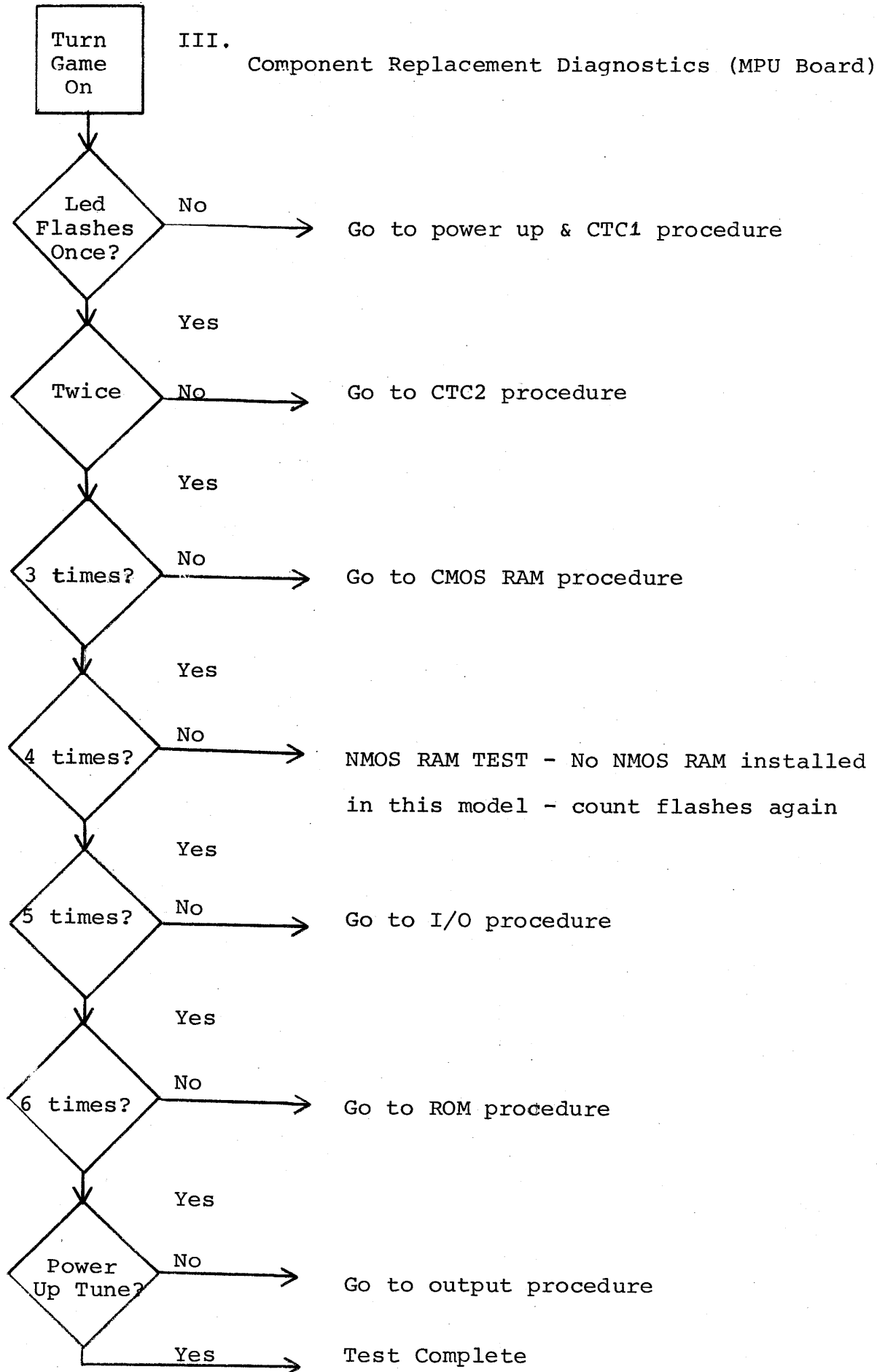
COMPONENT REPLACEMENT

A. Power up and CTC1 procedure

_____

Cause   Procedure

+5V incorrect   Measure +5V $\overset{+}{-}$ .25V at

                           TP1 of MPU board. If incorrect

                           refer to power supply diagnostics.

+24VDC incorrect   Measure +24VDC $\overset{+}{-}$ 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 pluse is present at TP4,

                           replace 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 pluse

                           at pin 17 of U10 and pin 26 of U11.

                           If one or both are incorrect and a neg-

                           ative reset pulse is present at TP4,

                           look for open or shorted foil run.

D. Oscillator incorrect

E. LED circuit defective

F. U10, U11, U17, U6, U7, U12, U4, U3, or U9 defective.

If both are incorrect and no negative reset pulse present at TP4, trace back through QD, QA, QB, U5 and U3 for defect. Check TP5 for a square wave with a period of about 400ns. If incorrect trace back through U3 to the crystal.

Check for positive pulse at base of QE. If present replace QE. If operation still incorrect, replace LED.

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 of U10 for positive zero cross over pulse. If incorrect trace back through U3 and U2.
U10 defective	Replace U10 with a known good I. C.

U3 Defective

Replace U3 with a
known good I.C.

U11, U6, U7, U12, U13 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. I/O Procedure

Cause	Procedure
I/O defective	Replace U17
I/O chip select gate defective	Replace U4

E. ROM Procedure

Cause	Procedure
ROM defective	Replace U12 and U13 one at a time.

F. Output Procedure

Cause	Procedure
U14, U16, U21, U15, U19, U22, U18, or U23 defective	Replace on at a time with known good parts.

IV. POWER SUPPLY DIAGNOSTICS

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

Symptom 1.   +5V incorrect, +12V correct

Cause	Procedure
defective +5V regulator	Change LM323 with known good.

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

Cause	Procedure
Fuse Blown (+12V)	Replace Fuse
defective bridge	Check 10.5 VAC input to bridge. If correct, replace bridge with known good. If +5 and +12V still do not come up, replace 11,000 MF capacitor.

Symptom 3.   +5 and +12V correct, +24V incorrect.

Cause	Procedure
Fuse Blown (28VAC) on Power supply	Replace Fuse
defective bridge	Check 28 VAC. 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 8VAC. 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 incorrect replace transformer. If voltage comes up, disconnect all pc boards that the winding goes to, reinsert fuse, and plug pc boards back in until defect reappears.

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

Cause	Procedure
defective transformer	replace with known good transformer.

V. 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	010
Knocker	020
Chime D	030
Chime C	040
Chime B	050
Chime A	060
Left Drop Target	070
Center Drop Target	080
Right Drop Target	090
Kickout Hole	100
Left Thumper	110
Right Thumper	120
Upper Sling Shot	130
Left Sling Shot	140
Right Slingshot	150
Flipper Relay Enable	160
Feature Lamps ON	170
Feature Lamps OFF	180

B. Table 2   SWITCH IDENTIFICATION

In the switch checkout section of the diagnostic routine
the number of closed switch is shown in each display. One
of the Chuck-A-Luck switches is always closed. Closing any
other switch overrides the closed Chuck-A-Luck switch and it's
number is displayed. The following list identifies each
switch by number:

SWITCH FUNCTION

Diagnostic and Accounting	260
1000 and Advance	200
Spinner	230
Spinner Lane Rollover	320
Collect Bonus / 5000	240
Left Thumper	210
Right Thumper	220
Upper Slingshot	250
Left Slingshot	150
Right Slingshot	130
10 Pt. SW(S)	090
Extra when Lit	160
Special when lit	140
Ball Return	110
Coin Chute 1	070
Coin Chute 2	050
Coin Chute 3	060
Tilt	080
Slam	030
Credit	020
Accounting Reset	010