GAME PLAN, INC.

SHARPSHOOTER PINBALL

(MODEL 130)

INSTALLATION
AND
REPAIR MANUAL

GAME PLAN, INC.
1515 W. FULLERTON AVE.
ADDISON, IL 60101

02-30018

MODEL 130:   INSTALLATION AND REPAIR MANUAL

                    INSTALLATION   INDEX

                    REPAIR   INDEX

Page 2

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 connect to the P.C. boards and power supply board. Note that the connectors and headers are keyed to prevent connection errors. Make certain the key in the connector mates with the key in the header. Connect ground braid to backbox shielding screw.

Check all connections 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 VI, 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 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 should flash for the player up, ball in play 1 should be lit for number of players 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.

III. FEATURE OPERATION & SCORING

The S-H-A-R-P lanes increment score by 1000 PTS. and advance bonus immediately for the first time the lane is made. After all lanes are made the additional bonus for lanes made more than once is awarded. The drop targets score 1000 PTS. and advance bonus .

The thumpers score 100 or 1000 when lit. They are lit by making the top stand up target for the upper left and lower top thumpers, and the bottom stand up target for the upper right and lower bottom thumper. The spinner scores 100 or 1000 when lit and is lit by advancing bonus multiplier to 2X.

The loop lane rollovers score 100 or 1000 when lit and advance bonus. They are lit by making the S-H-A-R-P lanes. The top loop rollover also advances the kickout hole multiplier and awards extra ball when upper extra is lit.

The lower extra when lit lane scores 1000 PTS., advances bonus and awards extra ball when lit.

The lower special when lit lane scores 1000 PTS., advances bonus, and awards special when lit.

The kickout hole gives 5000 PTS., or 2X 3X 4X 5X times 5000 PTS. when lit, or awards special or 25,000 PTS. when lit.

Page 4

The outhole bonus multiplier is advanced by making S-H-A-R-P lanes, S-H-O-O-T-E-R targets or kickout hole. Making S-H-A-R-P lanes or S-H-O-O-T-E-R targets after 5X outhole bonus is achieved lites special. Making S-H-O-O-T-E-R targets after special has been achieved causes last target down to flash for special.

All bonus for current ball is collected when ball falls in the out hole. When an extra ball is awarded it is played immediately following the ball that won it. All features with the exception of the S-H-O-O-T-E-R targets are carried over from ball to ball for each player

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 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 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 game over mode before entering into the accounting routines.

The accounting routines are entered by pressing the test switch inside the coin door. The number of the accounting function

Page 5

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 board while that particular accounting function is being displayed.

Replay levels and high score to date are reset to 100,000 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
* 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
     Number of Credits On Game

* Resets to 100,000 by pressing S33 on MPU board, can be incremented 10,000 points for each depression of the credit button.

When reading counters 1 through 5, 10 and 11 do not include units digit which is always zero.

For example, if 006240 is displayed for coin counter 1, then 624 coins have been counted. If 000120 is displayed for number of credits on the game, then there are 12 credits on the game.

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 options, 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 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

Page 2

S1 through S5 select the credits per coin for 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	
	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	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 is on, credits are decremented normally until 0 credits, then pressing the credit button puts 99 credits on the game and

8

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, S26 and 27. Switch Settings are as follows:

MAXIMUM CREDIT	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

Page

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 seperate 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 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 twelve 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 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. 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.

Page 11

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 12 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
SYMPTON 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

Page 13

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.

Page 14

	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)

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 → Go to NMOS RAM Procedure

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

Page 16
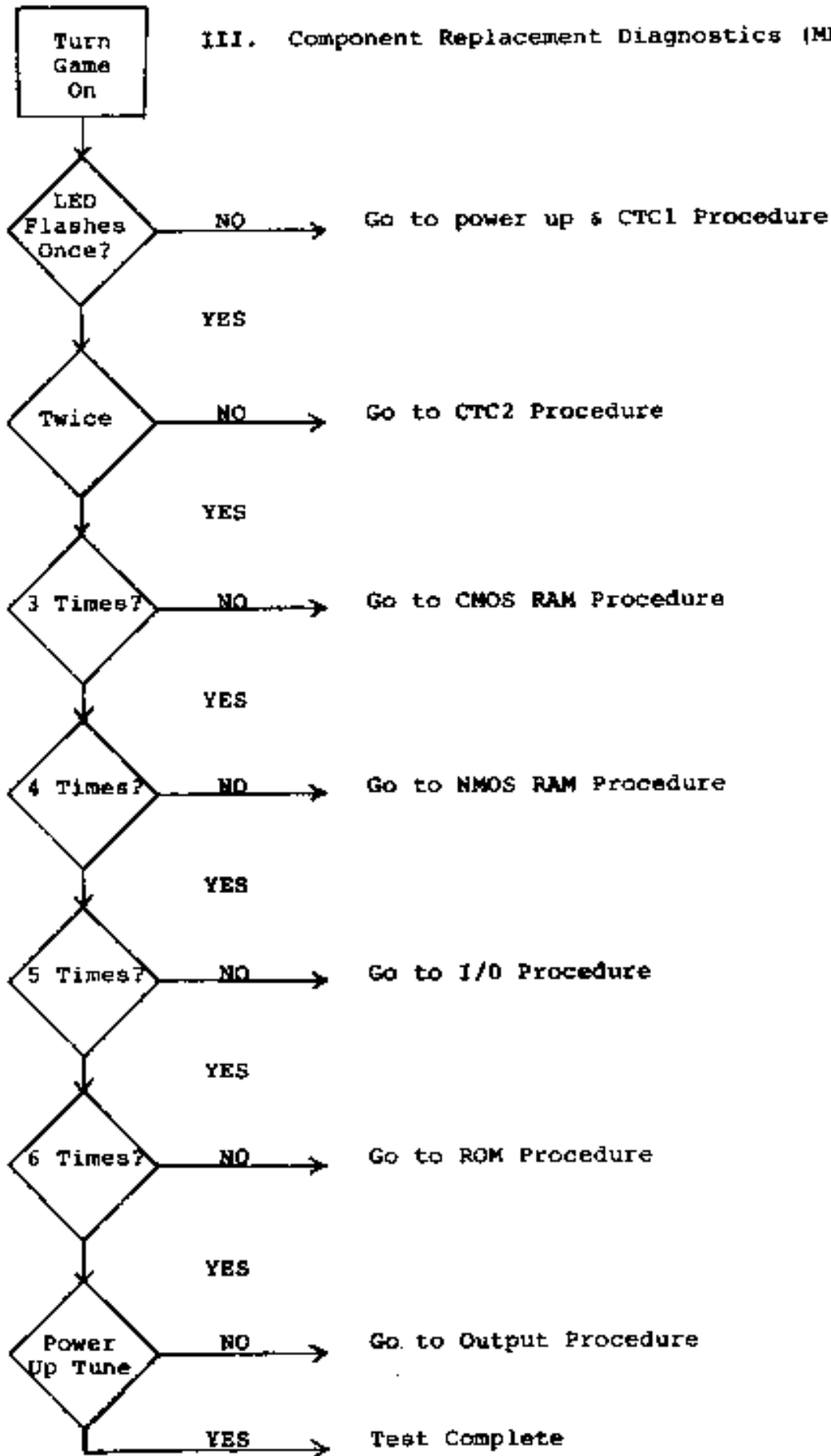
COMPONENT REPLACEMENT

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, 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
negative reset pulse is present at
TP4, look for open or shorted foil

		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/O Procedure

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

F.   ROM Procedure

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

Page 19

G   OUTPUT PROCEDURE   .

       CAUSE .   PROCEDURE

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

Page 30

IV.   POWER SUPPLY DIAGNOSTICS

CAUTION: The power supply contains dangerous voltage
levels. Use extreme 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) Defective Bridge	Replace fuse 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 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 still incorrect 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.

Page 22

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
Upper Left Thumper.................020
Upper Right Thumper...............030
Kickout Hole......................040
Drop Targets......................050
Sling Shot........................060
Top Lower Thumper.................070
Bottom Lower Thumper..............080
Not Used..........................090
Not Used..........................100
Not Used..........................110
Not Used..........................120
Not Used..........................130
Not Used..........................140
Not Used..........................150
Flipper Relay Enable..............160
Feature Lamps On..................170
Feature Lamps Off.................180
```

Page 23

B.   Table 2   SWITCH IDENTIFICATION

    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

        Accounting Reset...............................010
        Credit Button..................................020
        Slam Switch....................................030
        Drop Target "T"................................040
        Coin Chute 2...................................050
        Coin Chute 3...................................060
        Coin Chute 1...................................070
        Tilt Switch....................................080
        10 Pt. Score Switches..........................090
        Drop Target "E"................................100
        Ball Return....................................110
        A Lane...120
        R Lane...130
        P Lane...140
        Sling Shot.....................................150
        Lower Extra When Lit...........................160
        Drop Target "R"................................170
        Lower Special When Lit.........................180
        Top Stand Up Target............................190
        Lower Stand Up Target..........................200
        Upper Left Thumper.............................210
        Upper Right Thumper............................220
        Spinner..230
        Kickout Hole...................................240
        Loop Lane Sw. 1................................250
        Diagnostic and Accounting......................260
        Loop Lane Sw.2.................................270
        Loop Lane Sw. 3................................280
        Loop Lane Sw. 4................................290
        Loop Lane Sw. 5................................300
        Drop Target "S"................................310
        Drop Target "H"................................320
        Top Lower Thumper..............................330
        Bottom Lower Thumper...........................340
        Drop Target "O" (Left).........................350
        Drop Target "O" (Right)........................360
        S Lane...370
        H Lane...380
        50,000 Pt. Lane................................390
        1000 And Advance Lane..........................400