

COCKTAIL TABLE PINBALL

CHECKOUT AND MAINTENANCE MANUAL

SWITCH IDENTIFICATION CHART

- 10 LEFT THUMPER BUMPER
- 20 MIDDLE THUMPER BUMPER
- 30 RIGHT THUMPER BUMPER
- 40 LEFT BULLEYE
- 50 RIGHT BULLEYE
- 60 LEFT SLING SHOT
- 70 RIGHT SLING SHOT
- 80 OUT HOLE
- 140 SPECIAL
- 150 RAIL SWITCHES (4 SWITCH)
- 160 BALL IN PLAY SWITCH (OPTIONAL)
- 170 RAISE DROP TARGET A
- 180 RAISE DROP TARGET D
- 210 500 PT. SW. (LOWER LEFT, TOP & LOWER RIGHT)
- 220 RAISE DROP TARGET B
- 230 RAISE DROP TARGET C
- 240 1000 PT. EXTRA BALL WHEN LIT (TOP)
- 250 DROP TARGET A
- 260 DROP TARGET B
- 270 DROP TARGET C
- 280 DROP TARGET D
- 310 TILT SW. (BOTH ROLL & PENDULUM)
- 320 CREDIT SWITCH
- 330 SLAM
- 340 COIL SWITCH 1
- 350 COIL SWITCH 2
- 360 COIN SWITCH 3

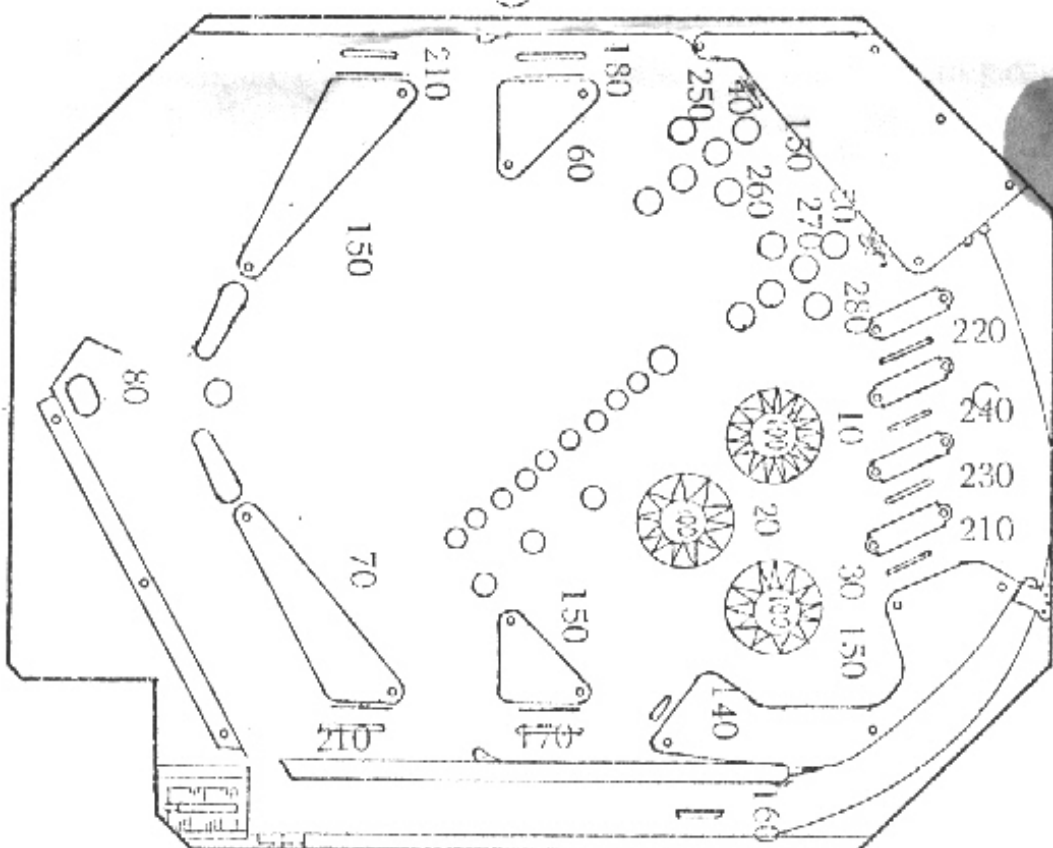


FIGURE 2

SELF DIAGNOSTICS PROCEDURE :

The self diagnostics sequence is started by pressing the test switch located on the front left side of the cabinet as shown in figure 1. The test may be terminated at any time by momentarily removing power to the machine.

The following steps in proper sequence should be taken to checkout the machine :

- I. Reset signal test. Momentarily turn machine power off and then on.
 - A. For approximately 2 seconds after the power is reapplied :
 1. The score units should be extinguished.
 2. The credit display may show erroneous data.
 - B. After the 2 seconds have expired:
 1. The score units will relight, and reset to zeros.
 2. The credit unit will reset to zeros.
 - C. No coils should energize at this time.

If all of the above occurs properly, continue to step II. If it does not occur, then turn to the section which checks:

1. 5 volt power supply (page 7)
2. Main computer board reset signal (page 7)

Note : Test I must be completed before performing step II.

- II. Score and credit display test. Momentarily press (for 1/2 second) the test switch mounted on the roll tilt ass'y. This is shown in figure 1.
 - A. The score displays and credit display digits should all start sequencing from 0 thru 9 and repeat.

If any score unit is not operating correctly, turn to score display trouble shooting (page 8).

Once you are satisfied that the displays are functioning correctly, proceed to step III.

Note : Step II must be completed before entering step III.

- III. Stuck switch test.
 - A. Remove the ball from the game.
 - B. Momentarily press (for 5 seconds) the credit button. The credit unit will display 2. Score unit 1 will show the number of any switch that is closed. Use the switch location chart figure 2 to identify the switches with their numbers. If score unit 1 displays 0, then no switches are closed.

Once you are satisfied that no switch is stuck, proceed to test IV.

Note : Step III must be completed before entering step IV.

IV. Lamp and score blanking test. Momentarily press the test switch twice (approx. 5 seconds). The credit display should now display 4. Ignore any numbers on the score displays for this test.

- A. Credit display = 4
- Lamps that should be lit =
- Extra ball when lit
 - Rt. 1,000
 - Rt. 2,000
 - Rt. 3,000
 - Rt. 4,000
 - Lft. 1,000
 - Sling shot
 - Special
 - Ignore game over lamp
- B. Momentarily (1 second) press the credit button.
- Credit display = 5
- Lamps that should be lit =
- Lft. 1,000
 - ~~Lft. 2,000~~
 - Lft. 3,000
 - Lft. 4,000
 - 10,000 bonus lamp
 - Double bonus
 - Triple bonus
 - Ignore game over lamp
 - The sling shot lamps should not be lit.
- C. Momentarily (1 second) press the credit switch.
- Credit display = 6
- Lamps that should be lit =
- Ball in play : 1, 2, 3, 4, 5
 - Same player shoots again
 - Sling shots
 - Ignore game over lamp
- D. Momentarily (1 second) press the credit switch.
- Credit display = 7
- Lamps that should be lit =
- Players : 1, 2,
 - Sling shot
 - In this mode all score units should extinguish.
 - Ignore game over lamp
- E. Momentarily (1 second) press the credit switch.
- Credit display = 8
- Lamps that should be lit =
- Slingshot
 - In this mode, the bonus lamps down count from 9,000 to 1,000. (The 10,000 lamps were tested in step
 - The game over lamp flashes after the 1,000 bonus lamp
 - The tilt lamp flashes after the game over lamp.

The thumper bumper lamps and background lamps should always be lit. If any lamps do not properly light, refer to the discussion on trouble shooting lamps (page 8). Once you are satisfied that all of the lamps are properly working proceed to step V.

Note : Step IV must be complete before entering step V.

V. Coil tests. Momentarily (5 seconds) press the credit button. The credit should display 9. Ignore the score displays during this test. The coils should energize in the following sequence :

- A. Left thumper bumper and drop target A.
- B. Middle thumper bumper and drop target B.
- C. Right thumper bumper and drop target C.
- D. Target D.
- E. Left sling shot
- F. Right sling shot
- G. Outhole
- H. 1,000 pt. chime
- I. 100 pt. chime
- J. 10 pt. chime
- K. Replay knocker
- L. Flipper power relay.

If any coils do not function properly refer to the discussion on coils (page 9.).

Once you are satisfied that all of the coils are properly functioning proceed to step VII.

VI. Overnight burn in of game. This mode is primarily for use in our factory where we want to get an extensive preshipping test on our product. This mode is entered from step VI by momentarily (10 seconds) pressing the credit button. The credit display should display A. This test mode automatically sequences the game so that all lamps and coils are sequentially exercised.

VII. Final checkout. This is performed by momentarily removing power to the machine thus returning it to the pinball game mode. At this time the game should be exercised to verify that all targets, switches, etc. are properly functioning to give correct score, sounds, credit counts, etc.

DISCUSSION ON 5 V POWER SUPPLY :

The 5 volt power supply is used to supply regulated 5 volt power to the computer board and the peripheral display boards. The circuit (refer to the game schematic) is composed of a bridge rectifier, two capacitors and a 781105 regulator. This circuit should regulate between 4.8 VDC and 5.2 VDC. This 5 V can be measured across the 8,000 Mfd output capacitor. The input capacitor should have approximately 13-14 VDC.

The 5 V may also be measured -

1. Across C-19 the 2,200 Mfd capacitor on the computer board.
2. Across C-5 the 100 mfd capacitor on the score boards.
3. Across C-4 on the credit board.
4. From pin 6 to pin 4 on the line up board.

A low 5 volt supply could cause the game to be continually reset. This is discussed further in the section on power reset (page 7).

DISCUSSION ON SYSTEM POWER RESET

The purpose of the reset circuit is to guarantee that the system will start up in a known state upon the application of power and during an intense static discharge. Upon application of power to the game, led 1 should momentarily light for approximately 2 seconds and then extinguish, thereby indicating a proper reset condition.

If this led does not come on or refuses to extinguish, check the 5 volt power supply. If the computer board has 5 volt across C 19 (the large capacitor in the lower right hand corner) and led 1 is not functioning properly, then the malfunction is the reset circuitry on the main board.

DISCUSSION ON THE SCORE DISPLAY

The following signals are necessary to light the score display :

1. 4.8 V - 5.2 VDC across C-5 (The 100 mfd capacitor).
2. 7.8 VDC.
3. Proper score blanking (led 4 should be momentarily flashing).
4. Proper data from the computer board (led 3 should be momentarily flashing).
5. Proper score clock signal.

If any score unit is suspected, it can be interchanged with another score unit. The best way to test for proper score unit function is in the self diagnostic test procedure.

A quick way to check for score blanking is to check led 4 on the main computer board. Led 4 should be on during power reset, and should momentarily blink whenever score unit 1 is updated or blanked out.

If you are uncertain about whether the problem of the score units being continually extinguished is due to a bad blanking signal :

1. Remove game power.
2. Completely remove the computer board.
3. Reapply game power; if the score units now light then the faulty blanking signal is due to a bad computer board.

Always remove power before removing or replacing any printed circuit boards.

DISCUSSION ON THE CREDIT DISPLAY

The operation of the credit display board is identical to that of the score unit with the exception that the credit unit does not require a blanking signal.

The best way to functionally test the credit unit is in the self diagnostic mode.

DISCUSSION ON LAMPS

The background lamps, with exception on the sling shot lamps are in a normal circuit operating on 6 V AC as shown in the schematic.

All lamps tested in the self diagnostic mode (except the game over, tilt, and sling shot lamps) are driven from the main computer board. All of these lamps have one side of the lamp tied to +7.8 VDC. The other side of each lamp is switched by the computer board to system ground. Each of these lamps (except the game over, tilt, and sling shot lamps) have a 100 Ohm resistor on the computer board which keeps them partially glowing. If during the self diagnostics of these lamps, a lamp is suspected, check if it is partially lit. If it is partially lit, and is not fully lighting, then the computer board is at fault.

If none of the lamps light during the self diagnostics, then trouble shoot the 7.8 VDC power supply. (Refer to the game schematic)

If the main computer board is suspected, a quick test to check the continuity of a particular lamp circuit is as follows:

1. Remove game power.
2. Completely remove the main computer board.
3. Reapply game power.
4. Remember: the only function the computer board performs when turning on a lamp is to supply system ground. Thus, if you take a jumper from system ground to the output pin from the computer board which connects to the lamp, the lamp should light if the harness and power supply are working properly. Do not do this unless the computer board is removed. Refer to the game schematic to get proper pin connections. If the suspected circuit functions properly, then the fault is on the computer board.

The game over, tilt, and sling shot lamps all have one side tied to +7.8 VDC. The other side of the lamp is switched to system through a circuit similar to that which drives the coils. This circuit does not have a 100 ohm resistor; hence, these lamps will not dimly glow in the off state. These lamps if suspected can be tested in the same manner as above.

DISCUSSION ON COILS

All of the coils in the game (including the flipper power relay) have one side tied to +32 VDC. The computer board switches these coils to system ground to complete the circuit thus energizing the coil.

If a coil driver on the computer board is suspected, a quick test of the remaining circuitry is :

1. Remove system power.
2. Completely remove main computer board.
3. Reapply power.
4. Remember: The only function the computer board performs when turning on a coil is to supply system ground. Thus, if you take a jumper from system ground to the output pin from the computer board which connects to the coil, the coil should energize if the circuit is working properly. DO NOT DO THIS UNLESS THE COMPUTER BOARD HAS BEEN COMPLETELY REMOVED FROM THE GAME.