

Judge Dredd Locking Ring Mod

Caution: Please read this entire document before installing anything.

History

The original Judge Dredd with L1 Prom would lock 3 balls and then enter multi-ball. Unfortunately, this feature required the crane and associated optos to work perfectly or the game would malfunction. This was not a problem for home use but it would be unacceptable in an arcade. At the last minute Bally scrapped the idea and cut slots in the dead world rings.

Theory of operation

The L6 & L7 Prom use switch 67 “Left Ramp Enter”(just below the crane) to operate the diverter. The L1 Prom uses switch 32 to operate the diverter. The opto boards use one column driver and 7 rows to generate inputs. The opto board is already using column 6, so column 3 is not available. When column 6 is active, my board stores the state of row 7 in the 4013 flip-flop. When column 3 is active my board outputs this stored value on row 2, creating switch 32. Since column 3 is not available on the connector of the opto board, an external wire must be used. While it is true that column 3 is used on other switches nearby, it is much cleaner and reversible to get it from a connector on the CPU board.

Precautions

The mod board uses CMOS logic gates, which are extremely static sensitive. The CMOS inputs are protected by resistors, but static precautions should still be used. If possible wear a ground strap, or discharge your hands to the ground braid on the cabinet. Take your time and avoid bending pins on connectors or on the Prom chip. The old prom chip should be stored in shipping container from the new one and stored in an antistatic bag.

Installation

- 1) Install the locking ring, but do not install the new prom or board yet. Make sure the silk screened ring is not upside down. The ring slopes into the hole.
- 2) In the diagnostics – switch edges screen, verify that optos 67 “Left Ramp Enter”, 63 “Left Ramp To Lock”, and 62 “Crane Exit” toggle when blocked with your hand (See Figure 1 for locations). If switches do not function properly, see trouble shooting section.
- 3) Play 1 game with the glass off. Roll a ball past opto 63 “Left Ramp To Lock”. The ball should wait for the ring to turn and roll into the hole. If it doesn’t roll onto the ring, then dead world may need to be lowered slightly. If it rolls past the hole or under the metal guide, then the dead world may need to be raised. The ball should fit under the metal guide when it is in a hole but should not fit when it is on the ring surface (See Figure 2).
- 4) Use diagnostics – Adjust Arm Test. Adjust the crane arm until the magnet is perfectly centered over a ball in the hole.

5) Turn off power and install the L1 Prom. Remove the large 12-pin connector from the right opto board (See Figure 3). Plug the connector into my board. Then plug my board into the opto board. Route the single wire under the playfield and up into the back box. Insert the connector into J206 or J207 on the CPU board. This is the column driver connector (See Figure 4).

6) Play a game with the glass off.

- A) Knock down the “JUDGE” targets in order.
- B) The ring should begin to spin and “dimensional phase 3” should be spoken.
- C) Roll a ball up the left ramp. The diverter should send it to the dead world and the ball locked graphic should be displayed. A ball should be waiting at the right shooter.
- D) Repeat step C two more times. This will start multi-ball. The shooter will shoot the remaining 2 balls, and the crane should empty the dead world. Catch each ball and hold them. This will prevent the drain shield from shooting them again.
- E) Now roll another ball up the left ramp. The ball should roll all the way around to the right outlane and the jackpot should be awarded.

Switch 28 Ball on magnet

The original game was designed to use a micro switch to sense that the magnet was working well enough to pick up a ball. The switch was eliminated along with the locking feature. All that remains is a 2-pin connector that hangs down under the crane. Since the switch no longer exists, this input never toggles. According to the manual, if a switch “has NOT been actuated during ball play (for 90 balls or 30 games)”, a Check Switch error will be generated on power-up until the switch is actuated. Since there is no switch you can’t toggle it and the error will persist. The L1 prom doesn’t seem to care if switch 28 comes on when the magnet picks up a ball, but if the switch is stuck on, then it thinks the ball is stuck and it loses count of the balls. This error will not affect the game. I am presently working on a small plug in circuit to eliminate this non-fatal, nuisance error. There are 2 options: A manual pushbutton and a diode connected to the unused connector or an automatic transistor circuit that toggles once on power-up.

Troubleshooting

- 1) Diverter does not operate – check switch 32 in diagnostics – switch edges. All targets must be down and the dead world should be spinning. If there were balls left in the dead world from a previous game, the game will not divert until the number of balls in the dead world have entered the ramp. Also see opto troubleshooting.
- 2) During multi-ball, if a ball drains, the ball ends before all balls drain – Check switch 62 “Crane Exit” in diagnostics – switch edges. Also See opto troubleshooting. Balls must exit only at the crane.
- 3) Ball locks but shooter doesn’t have another ball – check switch 63 “Left ramp to lock” in diagnostic switch edges. Also see opto troubleshooting.

- 4) After locking 1 or 2 balls, the shooter begins shooting balls - Check ball trough optos. See opto troubleshooting.
- 5) Switches are triggering by themselves only when mod board is in - Check Column 3 connection to CPU. Also 4001 IC may be bad.
- 6) The LED on the Mod Board is toggling by itself - Check IDC connectors for loose wire on Column 6 or Row 7.
- 7) Switch 28 "Ball on magnet" - This is normal.

Opto troubleshooting

Check opto in diagnostics - switch edges. Use your hand to block the sensor. Check the connectors under the playfield for matching wire colors. The connectors are similar and could be connected to the wrong input. With the room darkened, use a pen flashlight to trigger the opto receiver. If the receiver sees the flashlight, then check the transmitter with a night vision camcorder or Radioshack sensor card. Check the IDC connectors on the opto board. Check the connector pins and the 2-Watt resistors for bad solder joints. If the opto board is suspected, try swapping the left and right boards.

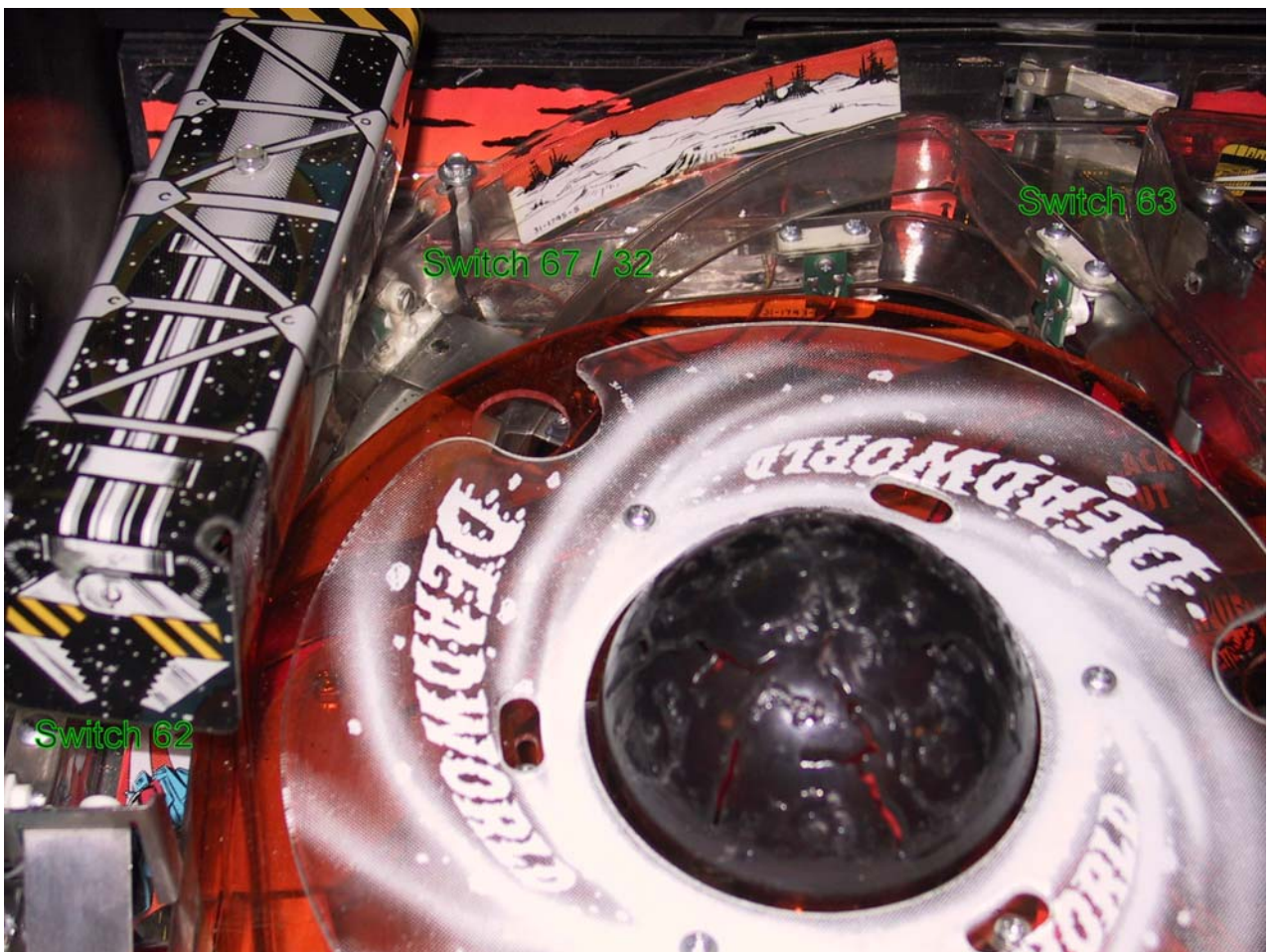


Figure 1 - Switch Locations.



Figure 2 - Ball on ring.

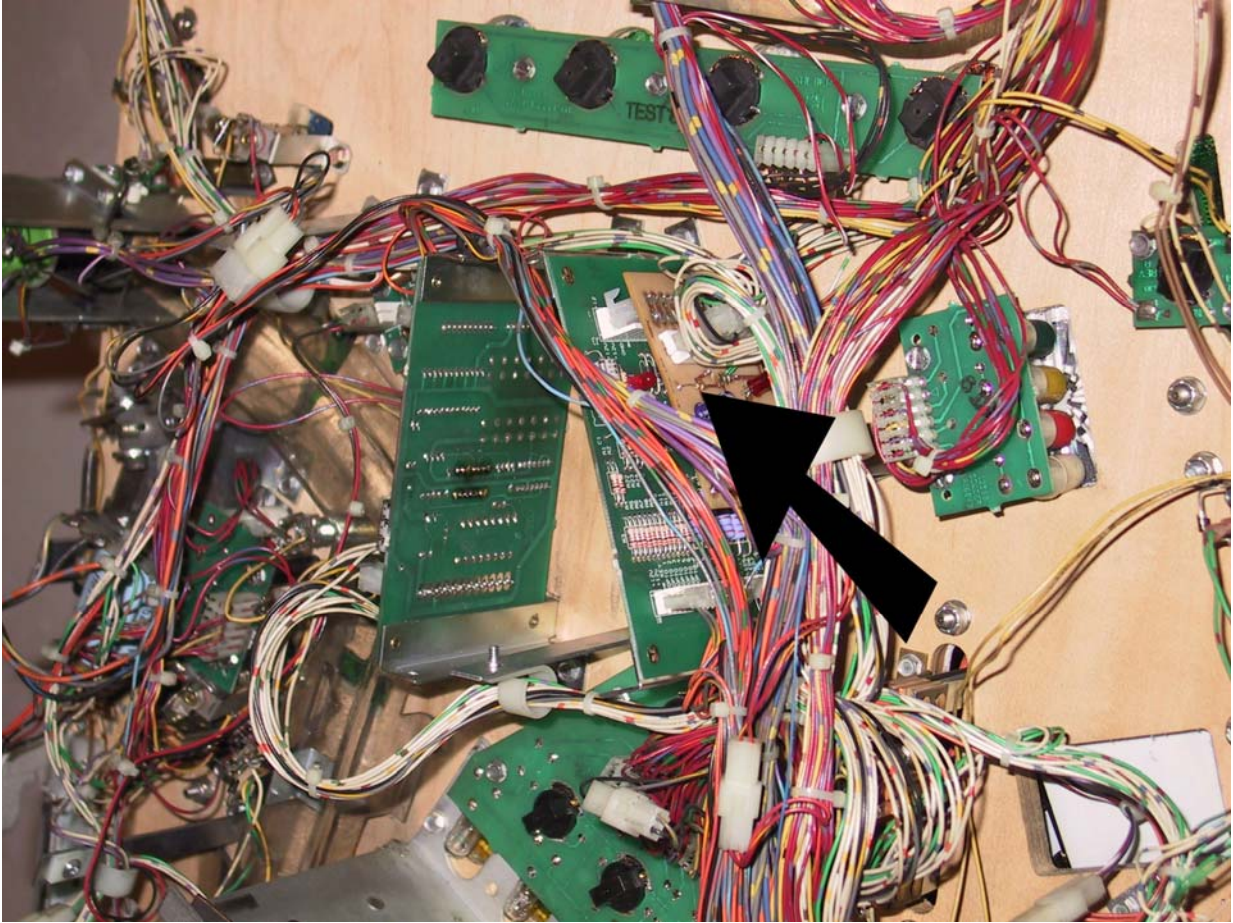


Figure 3 - Right Opto Board.

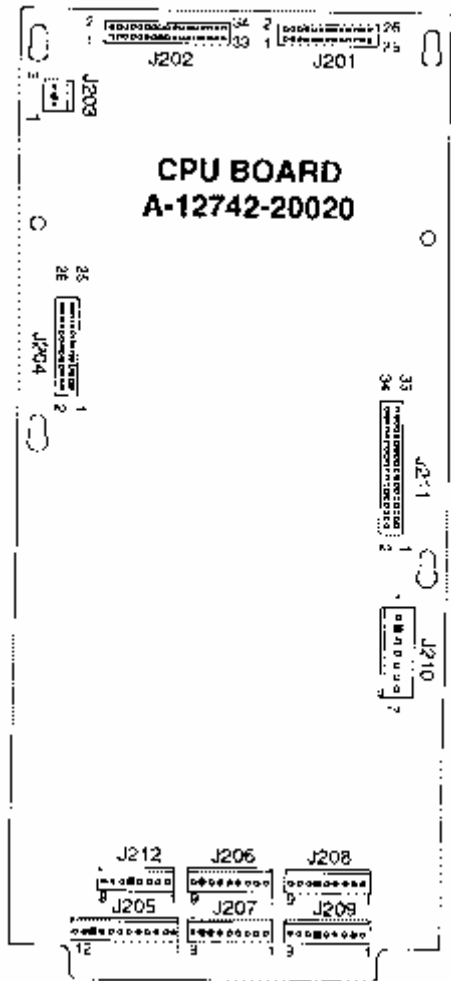


Figure 4 - CPU Board

Parts List

- C1 – 100uF 25V electrolytic
- C2, C3 – 0.1uF ceramic 25V
- D1 – 1N4004
- IC1 - CD4013 CMOS Dual D Flip Flop 14 pin DIP w/gold plated socket
- IC2 - CD4001 CMOS Quad Nor 14 pin DIP w/gold plated socket
- R1, R2, R3 – 10K - ¼ Watt 5%
- R4 – 1K-¼ Watt 5%
- R5 – 100K-¼ Watt 5%
- 9 pin Molex receptacle w/0.1 spacing
- 12 pin Molex header w/0.156 spacing
- 12 pin Molex receptacle w/0.156 spacing

