

ON TARGET

Gottlieb

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MARS STARGATE

The stargate feature on MARS, god of war, is located on the left side of the playfield at the beginning of the launch tube (See Figure 1).

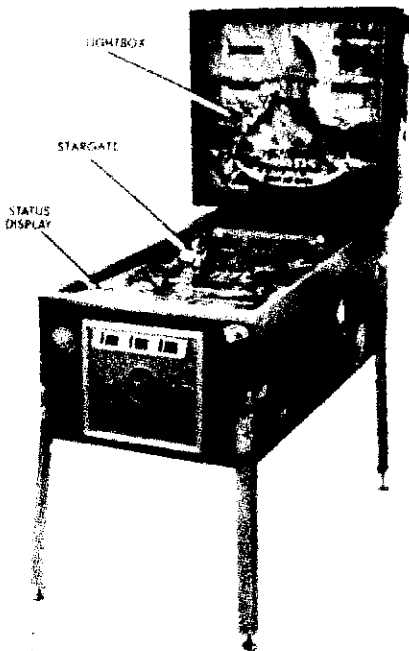


Figure 1

GAME PLAY - There are two ways to activate the stargate feature:

1. When either warbase is captured, the stargate is lowered and the plastic tube LED's are strobed. When left or right warbase is captured and the stargate drops, the sound/speech board says, "Shoot Stargate for Hyperforce."
2. If no ball is captured, a ball that travels through the right return rollover will lower the stargate. If the ball enters the launch lane through the plastic tube or from the playfield before hitting a pop bumper, the player will be awarded 50,000 points. Hitting a pop bumper ends the stargate feature, with the stargate returning to the up position.

OPERATION - Stargate Operation is shown in Figure 2A. The coil is activated when the stargate is in the up position and de-activated when

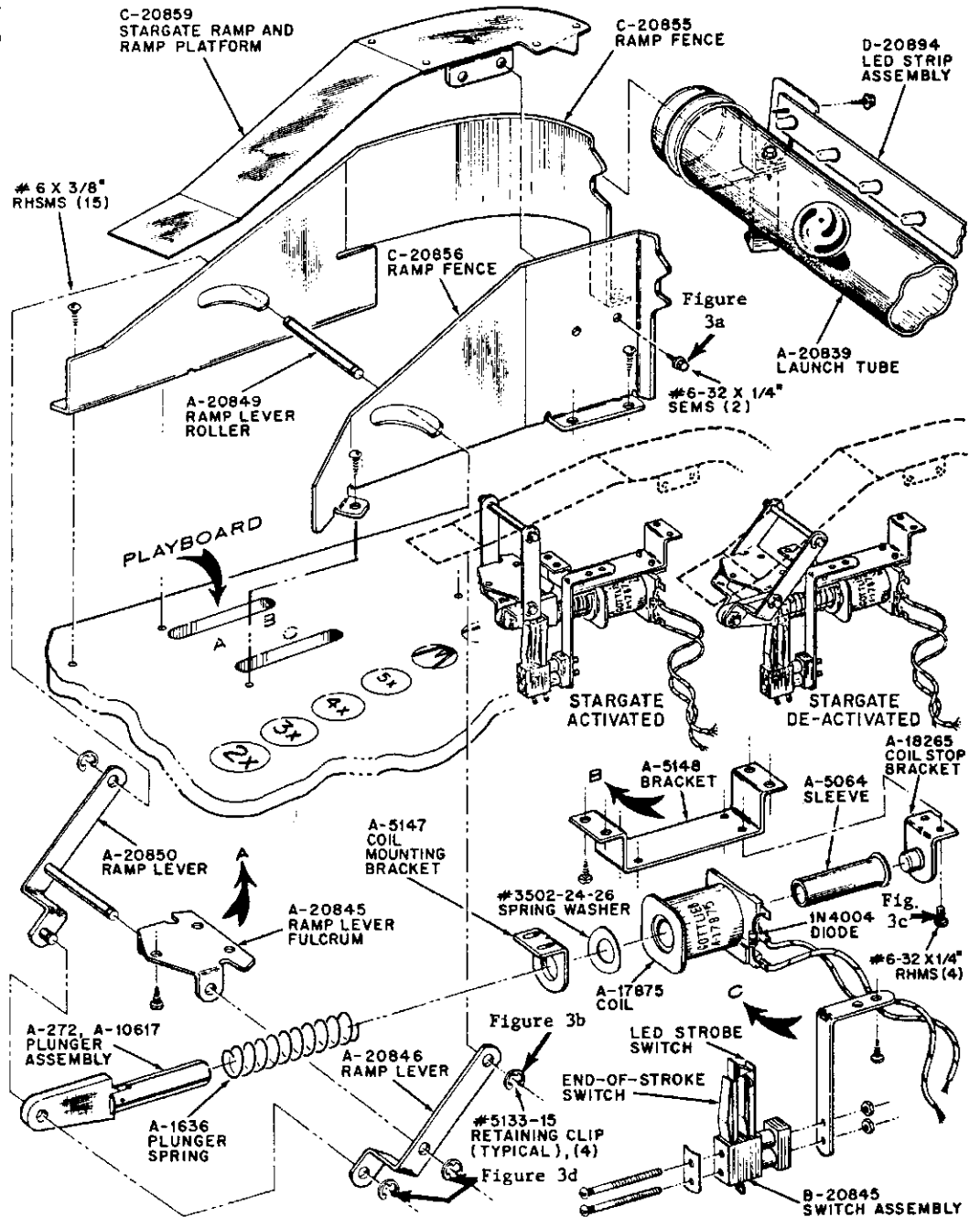


Figure 2

the stargate is lowered. The coil activates when 5 volts is applied to the base of Q9. This turns on Q9, which supplies a ground to the base of the 2N5875 PNP transistor. This forward bias voltage turns on the 2N5875, which supplies a ground to the coil circuit, resulting in coil activation. The 24 VDC voltage generates a current that passes through

the end-of-stroke switch and the low resistance windings of the ramp coil (direction indicated by the solid line). The plunger is pulled into the coil core with the end-of-stroke switch contacts opening approximately 1/16" before the full plunger stroke. The 24 VDC is now applied to the full winding, decreasing the current (direction indicated by dashed line).

(continued on p. 2)

MARS STARGATE

(continued from p. 1)

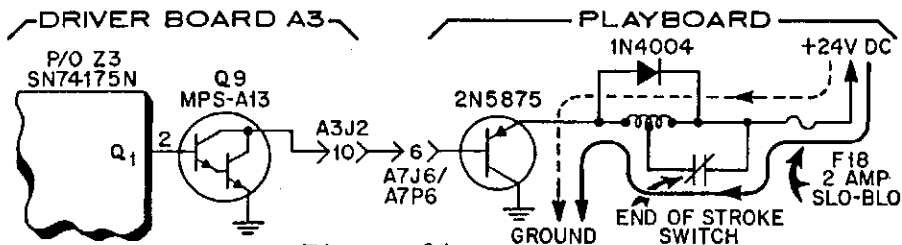


Figure 2A

Poor coil response or a coil burnout may result if the end-of-stroke switch is not adjusted as mentioned above.

Zero volts at the Q9 base keeps Q9 off. This, in turn, prevents the 2N5875 from conducting and activating the coil.

A second switch located with the end-of-stroke switch, turns on the LED strobes for the launch tube. When the coil is de-energized (the ramp lowered), this switch closes and the LED's begin to strobe. The LED's will continue to strobe until the ramp is raised, opening the switch.

The IN4004 diode across the ramp coil suppresses transient voltage spikes created when the magnetic field in the coil collapses (the coil is de-energized).

To disassemble the stargate or remove the coil, the following tools are required:

- A. 5/16" nut driver
- B. 1/4" nut driver
- C. Flat blade screwdriver
- D. Soldering iron (coil only)

REPLACING STARGATE RAMP AND/OR RAMP LEVER ROLLER

1. Unplug power cord.
2. Follow standard procedure for removing the playfield glass.
3. Using the 5/16" nut driver, remove the nuts securing both plastic shields from either side

of the stargate (2 nuts per shield).

4. Remove the plastic shields.
5. Remove the two 6/32 x 1/4" hex head screws located on the side of the ramp fence closest to the center of the playfield (See Figure 3a). A 1/4" nut driver or a flat blade screwdriver can be used.
6. Remove the ramp by lifting out with a slight clockwise turn.

RAMP LEVER ROLLER REMOVAL - With the stargate ramp removed, the ramp lever roller is now exposed and removal is simple:

1. Remove the two retaining rings (P/N 5133-15) located on either end of the ramp lever roller (See Figure 3b).
2. Slide roller out toward the center of the playfield.

RAMP LEVER - With the ramp lever roller removed, removal of the ramp lever is now possible. To remove the ramp lever:

1. Raise and secure the playfield.
 2. Locate the stargate assembly.
 3. Remove the two retaining clips located on the left ramp lever (Figure 3d).
 4. Remove the three round head wood screws securing the ramp lever fulcrum to the playfield.
 5. With the fulcrum freed, the right ramp lever can now be removed.
- Ramp, ramp lever roller, and ramp lever are now removed. To reassemble,

follow directions in reverse order.

COIL REPLACEMENT

1. Follow Steps 1 and 2 for replacement of stargate ramp.
2. Raise and secure the playfield.
3. Locate the ramp coil (A-17875).
4. Unsolder the coil wires, noting their terminal designations. (Also make sure the new coil has a diode across it and in the proper direction.)
5. Remove the two 6/32 x 1/4" round head screws securing the coil stop bracket (See Figure 3c).
6. Lift coil assembly out of the coil stop bracket.
7. Pull the coil away from the plunger assembly. (Be careful of loose parts.)
8. Pull the plastic sleeve out of the bad coil and insert it into the new one.
9. Slide the new coil into the plunger assembly, insuring that the spring washer slides over the plastic sleeve.
10. Replace and screw the coil stop bracket into place.
11. Solder the wires to their proper terminals.

Once the new coil is installed, check the end-of-stroke switch for proper operation as described in the electrical section.

Lower the playfield and close up the game. Be sure to check the operation of the stargate to insure everything was reassembled correctly.

FLASHBACK

Pinball's first spot target appeared on a Gottlieb game made in January 1950 called JUST 21. Since then, Gottlieb has been first with almost every new target: the two-switch bull's-eye target, first used on HARBOR LITES (Feb 1956); the roto unit, used initially on MAJESTIC (April 1957); the vari-target, seen first on AIRPORT (April 1969).

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