DECEMBER, 1980

DROP TARGETS

PARTI

TECHNICAL NEWSLETTER

A drop target is one which, when hit, drops down out of view through a slot in the playfield. Several drop targets are used together, mounted in a common frame. Gottlieb drop targets are made in units with three, four, five or seven targets; a three target unit uses a four-target frame. All targets are reset simultaneously by one or two solenoids, whereupon the targets reappear on the playfield. Behind the targets above the playfield is a rubber ring which when hit closes a scoring switch, exactly like other rubber contact switches elsewhere on the playfield. This switch is mounted to the rear of the bank.

Each target engages a target arm which pivots on a rod common to all arms. The target has a lip which rests on an edge of the frame and so is prevented from being pulled down by the arm until it is pushed off the edge when hit by the ball. Each target and arm has two springs, one to pull down the arm and the target when hit, and one to keep the target seated on the edge when reset. When the target drops, the opposite end of the target arm closes a scoring switch

and possibly another switch operating another game feature.

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Some banks have coils at the top of the bank which drop individual targets. These dropping coils are used with the game's memory for recalling the state of the targets from the previous ball or when targets are spotted by another game feature.

REPLACING TARGETS

Breakage of the plastic target causes the majority of service calls on drop target banks. A broken drop target no longer means the major repair job it once did. Gottlieb's System 80 drop targets can be re-

placed with nothing more than a screwdriver, a longnose pliers and a few minutes time.

Turn the playfield back so that its lower end is resting against the light-box. This gives the best access to the rear of the bank, the side with no switches except the rubber contact switch. Place all targets in the dropped position.

There are four screws on the back plate of the bank, two of which hold securing brackets to the bank.

Loosen, but do not remove, these four screws. Now remove the the screws holding the brackets to the bank.

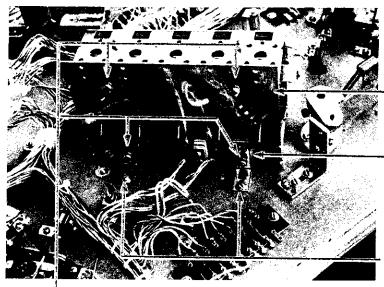
Do not loosen the screws that hold the bracket to the playfield. The bank is now held to the playfield by the brackets on the opposite side.

(continued on p.2)

BACK PLATE

PLAYFIELD

BRACKET



SCREWS

DO NOT LOOSEN

System 80 Control Board Revision board

James Bond and newer System 80 pinball games incorporate our new revised control board and game prom chip giving Gottlieb greater game design capability. A 2K 2716 EPROM (CMOS) has replaced the two 1/2K 7641 game PROM chips. This PROM change doubles the memory capacity for game programming. However, chip select addressing for the 2716 EPROM differs from the 7641PROM chips and control board modifications became necessary.

The old and new control System 80 control boards can be differentiated by their DETAIL(DET.) identification numbers. These numbers are located above the J6 connector on the component side of the

board. The old control board number is DET.PB03-D102-001. The revised control board number is DET.PB03-D107-001.

Some old control boards have been rewired to accommodate the 2K EPROM configuration. Four jumper wires can be found on the non-component side of the board. Three wires jumper the PROM 1 and PROM 2 locations. The fourth wire jumpers Z10. A 2716 EPROM cannot work with an old System 80 contol board if it is not modified, and 7641 PROMS will not work in a new control board. Older System 80 control boards can be easily modified to accept the new 2K EPROM allowing the control boards to be used in James Bond and newer System 80 games. The following procedure describes the modification:

MODIFICATION PROCEDURE

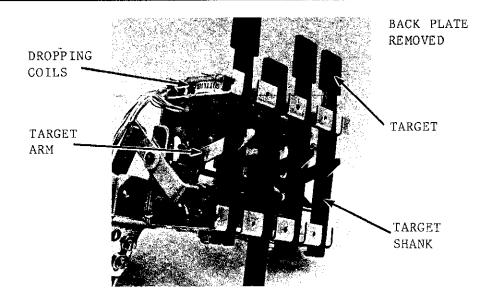
- A. COMPONENT SIDE OF CONTROL BOARD
 - 1. Cut trace extending to the left from between pins 6 and 7 of Z-10.
- B. NON-COMPONENT SIDE OF BOARD
 - Jumper Z-10 pin 13 to the pad located just below and to the right of Z-9 pin 7.
 - Gut traces leading to PROM socket l pins 21 and 19.
 - 4. Jump. PROM socket 1 pin 21/to prom socket 2 pin 24.
 - 5. Jump PROM socket 1. pin 22 to PROM socket 2.pin 18.
 - 6. Jump PROM socket 1. pin 19 to PROM socket 2 pin 21.

DROP TARGETS

(continued from p.1)

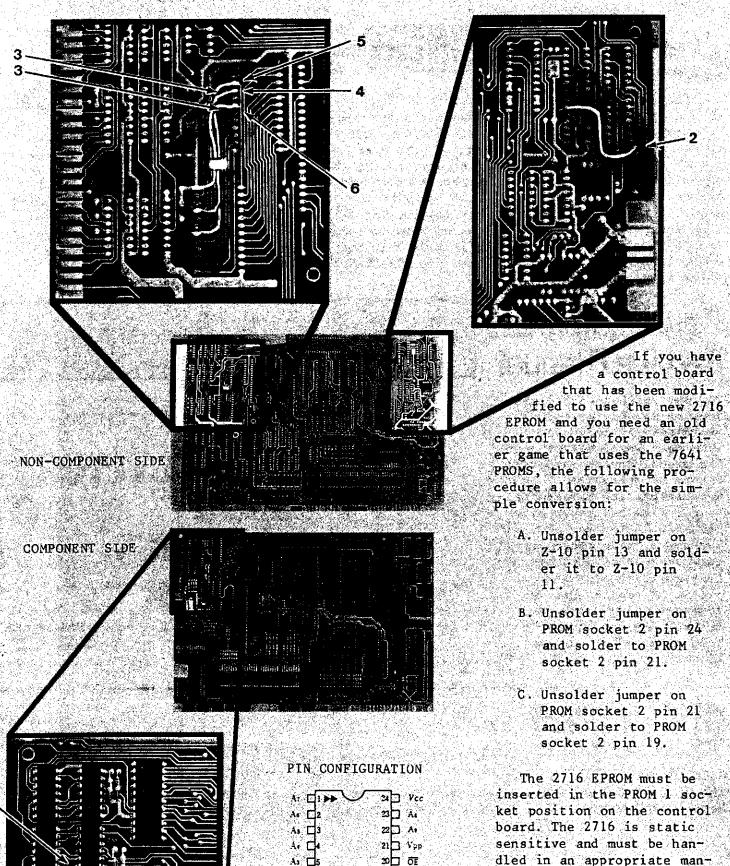
Unscrew the other two screws and carefully lift off the back plate. Unhook the spring from the target arm of the faulty target. Then move the target outward to disengage it from the arm. Remove the spring from the target and withdraw the target from the bank up through the playfield slot.

Insert the new target into the bank down through the playfield slot. Place the spring on the target and coat the target shank with White Lube. With a needle nose pliers, attach the other end of the target



spring on to the target arm and place the target arm in the target shank slot. The target should now be in the proper position. Replace the back plate by tightening the bracket plate

screws first. As in disassembly, this procedure ensures that the front plate brackets are neither bent not pushed out of adjustment from the force of the screwdriver.



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2716

(Top View)

dled in an appropriate manner to insure its protection. NOTE: On System 80 games with new 2716 2K EPROMS, self-test step 20 will still display 7641-1 for a faulty PROM even though the PROM part number has changed to 2716.



A device similar to a drop target appeared in February, 1951 on a game called MINSTREL MAN. Behind a spot target was a two-dimensional figure of a minstrel man, and this was attached to a solenoid. When the target was hit, the coil pulled the figure down, like a drop target. After scoring, the coil

turned off and the minstrel man reappeared on the playfield. Three of these units were used. WILD WEST (August, 1951), the only other game to use the unit, had one with the figure of an Indian. The drop target as we know it today was first used in May 1970, in the game CRESCENDO.

Next Month:

DROP TARGETS (PART II); conclusion of the two part series.

AUXILIARY LAMP DRIVER BOARD; Our new pinball game Time Line introduces this new System 80 circuit board

New System 80 Service Manual

New System 80 pinball game service manuals are now availiable at no charge from your local distributor. The manual covers in-depth theory of operation, troubleshooting procedures, system flow and power distribution diagrams, scope waveforms, electronic circuit schematics, and pin configurations for the system LSI components. An addendum sheet has been inserted in the manual listing printing changes.

MAILING LIST; Get ON TARGET every month by sending your name and mailing address to:

ON TARGET
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ON ARGET.

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