

ON TARGET

Gottlieb

TECHNICAL NEWSLETTER

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INTRODUCING GOTTIEB'S **CAVEMAN**

With the introduction of Gottlieb's new Pin-Video system, Caveman, Gottlieb is debuting a totally new system combining the best features of pinball and the appeal of a video game. While the owner/operator is no doubt thinking of the potential profitability and success of this new game, he may also be thinking of the potential maintenance and troubleshooting problems involved in a two-phase system. However, Gottlieb has incorporated a few new engineering and software features specifically designed for ease of troubleshooting and maintenance.

The development of our mid-size 2' x 4' cabinet was one of the key features that allowed Gottlieb to produce such innovative games as Black Hole and Haunted House with plenty of room for different playfields and the power supply. Our mid-sized cabinet has now allowed us to fit a 13" color monitor into the top center of the playfield and still have enough room on either side for a vari-target. This aligns the video monitor with

the playfield so the player doesn't have to shift his vision back and forth. The video

monitor aligned in a horizontal plane could have created glare problems. Therefore,



INTRODUCING GOTTLIEB'S **CAVEMAN** (CONT.)

the entire display section was redesigned in an overhanging fashion to cancel any glare. This also allows easier access to the displays and the speakers, which are mounted in the overhang and the electronics which are on a flip-down back panel.

The monitor itself and the mounting all have been designed with ease of maintenance and calibration with the operator in mind. This monitor is mounted on three metal brackets; one pivot bracket at the bottom rear of the monitor, and two bracket arms that are bolted to the side of the monitor and pull it flush against the back of the cabinet box, (See Figures 1 and 2).

A few layout and design improvements have been made over previous System 80 games. The cable layouts have all been lengthened to facilitate better access and movement of and around the monitor and power supply. The entire power supply and fuses have all been mounted on one board and pulled forward, just behind the cash box. This allows easier access to the fuses and test points and simpler tracing of wiring and connections.

There are two new fuses and power outputs for the video system. The F7, 5A Slo-Blo fuse is on a second 12VDC rectifier which drives a LAS1905 5VDC regulator for the Video CPU. The LAS1905 is a self-regulating device that

should require no adjustment of the 5VDC output as long as the input is above 8VDC. The F10, 2A Slo-Blo fuse for the monitor's 120V AC input is now socket mounted near the F9, primary power fuse for ease of access.

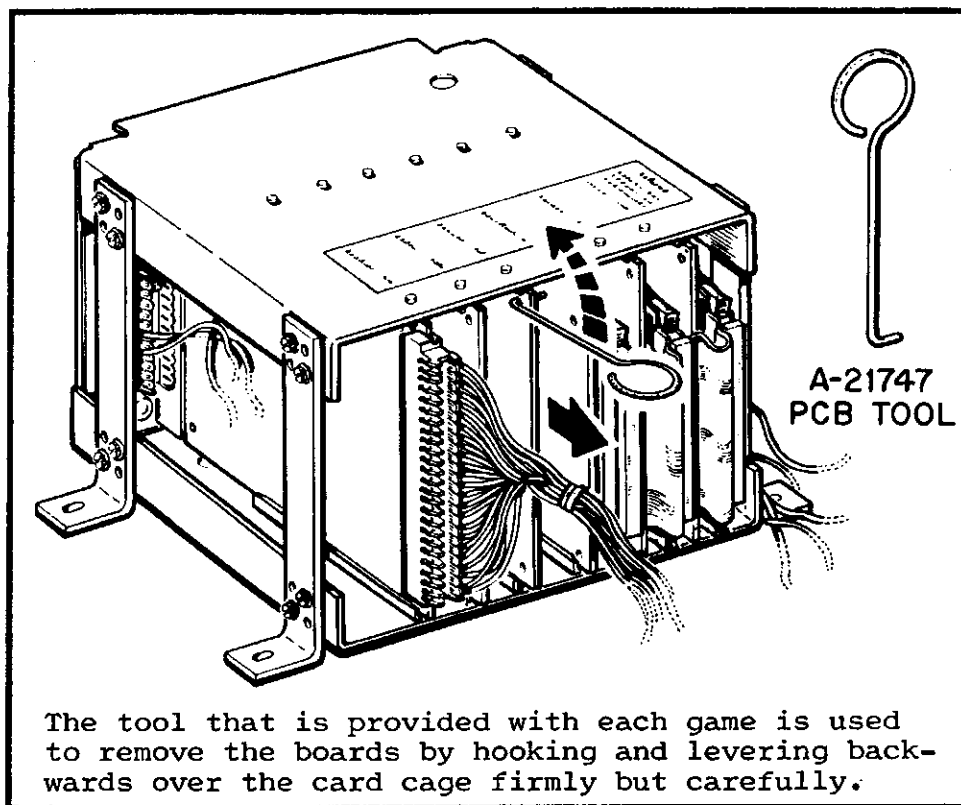
VIDEO CPU AND CARD CAGE

The modular construction of the Video CPU is itself a tool that can help in troubleshooting to the board level. The boards can be removed and swapped so that an individual board causing problems can be isolated. Each board controls special functions in the system so that understanding each board's function can allow faster determination of the problem area.

There are two signal-carrying connectors, A23J2 and A18J3, and one connector, A16J1, that plugs into the mother board to bring

the +5VDC and ground to the system. The A18J3 connector carries the video information to the CRT, using a composite SYNC signal, the Red, Green, and Blue color video signals and ground. The A23J2 is the interface connector that carries all the signals from the Pinball CPU, the joystick, and the slam line to and from the Video CPU.

The A23 I/O RAM board is the interface between the Video CPU and the Pinball CPU. We have dedicated a number of lines to tell the Video CPU what to do. Lamps 4,5,6, and 7 tell the Video CPU which player it will be starting with Lamps 12 thru 15 and Lamp 16 used as a strobe, will tell the Video CPU how it should begin the game (with or without extra ball, Caveman at right or left cave, pterodactyl on screen, etc...) Strobes 0 and 1



The tool that is provided with each game is used to remove the boards by hooking and levering backwards over the card cage firmly but carefully.

INTRODUCING GOTTLIEB'S **CAVEMAN** (CONT.)

have been dedicated to carry information from the Video CPU to the Pinball CPU using Returns 0 thru 6. (Note: In Pinball Self Test, Step 18, any of the switch #'s 00 thru 06 and 10 thru 16 may be shown in the displays. These should be ignored in Step 18.) A failure of the I/O RAM board would lock up the Pin game and the Video game would stay in the attract mode. A fault on just one lamp or strobe line would let the pin game play but the first time it tried to interface, the Video would lock up, thus locking up the Pinball game except for the outhole.

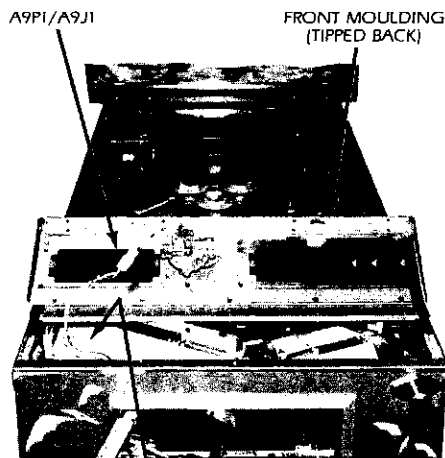
The EPROM board, A22, contains all the Video game play instructions, scoring, and the languages of the instruction attract-mode set. The CPU board, A21, controls all read/write functions, I/O communications, ROM and RAM memory accessing and all address and data manipulations to sequence these operations.

The three Video boards are a small CPU in themselves, just to control the video outputs, and even have their own address and data bus on A20, A19 and A18J2. The Video 1, board, A20, contains the video controller HD46505 which controls the video memory lines, memory accessing, sequencing of memory and data, outputs to screen and the vertical and horizontal sync lines. A problem with deflection or vertical or horizontal control

could originate from this board. The video 3 board, A19, contains all the ROM memory for the output of video and color information. This is different from the EPROM board. a failure here would show different colors, unfamiliar patterns, or blips and garbage on the screen. An EPROM Board failure would show up as a totally wrong maze, figures, or figures invisible while play is okay. The Video 2 board, A18, controls the breakdown of digital video information to analog video-color information and outputs it to the monitor on the A18J3 connector.

MAINTENANCE AND SERVICING ACCESS TO MONITOR

1. Open the cabinet door and loosen the front moulding locking arm.
2. Pivot the front moulding upward, disconnect the connector A9P1/A9J1, slide the moulding forward, and remove it from the game. (See Figure 1).



Note: Caution label stresses removal of ball from outhole before lifting playfield for monitor safety.

Figure 1

3. Slide the playfield glass forward and remove it from the game.

4. Pull the playfield toward you until it rests on the upper right and left mounting brackets.

Note: The color monitor contains HIGH VOLTAGES delivering LETHAL quantities of energy. Do not attempt to service the monitor until you have shorted the anode plug on the picture tube to ground.

5. Remove the two wing nuts and associated washers at the front of the monitor, and carefully lower the monitor to the bottom of the cabinet (See Figure 2).

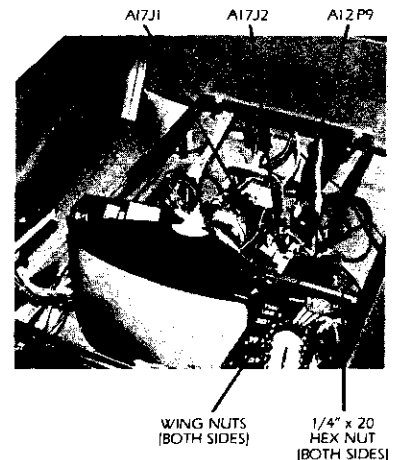


Figure 2

FOR REMOVAL OF MONITOR

1. The monitor's three plugs, A12J9, A17J1, and A17J2 should be disconnected and placed clear of the monitor.
2. Remove the two $\frac{1}{4}$ " x 20 hex nuts on the hold down angle bracket.
3. Lift the monitor straight up and remove it from the cabinet observing that all cables are clear of the yoke and monitor chassis.
4. For reassembly, reverse the aforementioned procedure.

SEMINAR ADVANCE NOTICE

Three seminars on
troubleshooting
Gottlieb Pinball Games
will be forthcoming:

Tuesday, June 22, 1982
A.M.A. Distributing
New Orleans, Louisiana
(504) 529-2315

Thursday, June 24, 1982
S & H Novelty
Shreveport, Louisiana
(318) 222-1642

Friday, June 25, 1982
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For more information
concerning location and
times of the above,
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FLASHBACK

Beginning in August,
1964 with BOWLING
QUEEN, Gottlieb used a
new faceted metal post
in place of the
conventional plastic
posts. The metal posts
were chromeplated and
were made in two pieces,
split at the rubber
line. They gave the
games a new look, but
by August, 1967, it
was decided that they
made a game look dark
and dingy, especially
when they tarnished.
HARMONY was the last
to have them.

comment corner

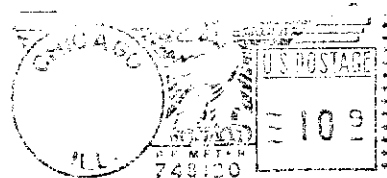


Believe it! Gottlieb
listens to you! D. Gottlieb
is aware that operator exper-
ience and expertise can only
help our efforts to produce
a more reliable and service-
able product. ON TARGET will
publish any letters of opinion
if it will be beneficial to
our readers. At times,
letters sent to us may not
appear in the upcoming issue.
However, they may be included
in future issues.

Notice

The Pinball/Video Service
Hotlines are now the same.
Call 800-323-9121, in Illinois
800-942-1620 from 8:00 a.m.
to 4:30 p.m. CST for any
Gottlieb pinball or video
game assistance.

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DONALD H SOKOLIS
2015 N KOLMAR AVE
CHICAGO, IL 60639