Self-Test

This game will test itself and provide data to show how the game circuitry and controls are operating properly. Self test data is printed visually on the video display and audibly through the speakers. No additional equipment is required.

We suggest you perform a self test when you first set up, each time you connect money, change the game options, or suspect game failure.

Table 1 RAM Failure Tone Sequence

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>PCB Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4E</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 3F</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 3E</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4F</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4G</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>RAM at 5D</td>
</tr>
</tbody>
</table>

Self-Test Main Menu

If all initial self tests pass, the main menu will be displayed as shown in Figure 4. This menu allows you to select from seven different areas. As indicated at the bottom of the display, set the self test switch to off (down) to exit from self test.

Entering SelfTest

to enter the self test mode, set the self test switch on the utility panel to the ON (up) position. The game tests the custom inputs/output (IO) compared circuitry (CIR), the read/write memory (RAM), the bit-matrix circuitry, the electronics-safety circuitry read only memory (EEROM), and the read-only memory (ROM). Figure 1 shows the resulting video display if these tasks pass. The custom input/output test is only test not shown on the video display. If the test passes, you will hear sounds that range from a low frequency to a high frequency.

Figure 1 Tests Video Display

If the RAM fails, a sequence of seven "beep" sounds will be emitted from the game speakers, followed by a pause, then the sounds will be repeated. Table 1 identifies the failing RAM for the emitted sounds. In this test, the "High" indicates high tones from the game speaker and the "Low" indicates low notes. If the bit-matrix circuitry fails, a sequence of "beep" sounds will be emitted as follows: High, low, high, low, low. If the EEROM fails, the video display will identify the failed IC as shown in Figure 2. The display will indicate a failed IC at either location 5A or 5B.

Figure 2 ROM Failure Video Display

Self-Test Main Menu Video Display

Table 1 RAM Failure Tone Sequence

<table>
<thead>
<tr>
<th>Tone Sequence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>PCB Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4E</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 3F</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 3E</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4F</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>RAM at 4G</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>RAM at 5D</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3 ROM Failure Video Display

Grid Display

The grid display shown in Figure 5 is used for adjusting the video display. When properly adjusted, the grid should be white on a black background. The corners of the grid should Just barely go off the corners of the display.

Figure 5 Grid Video Display

Accounting Display

The accounting display shown in Figure 6 is used for displaying historical information about the game. The photograph shown in Figure 6 was taken of an engineering prototype game. Therefore, in our example, no coins are shown for the left mechanism and only two coins for the right mechanism; but 40 coin credits are shown for the auxiliary coin switch. Ordinarily, the coin information is stored in the EEROM and a new set of coin counters is determined. This information may be compared with the information from the coin mechanism coin counters to determine the accuracy of the mechanical coin counters.

The most important information shown on the accounting display is the average game time. This time may be between 2 and 3 minutes. The display in Figure 6 is a good example of optimum game time. A histogram of game time is shown at the bottom of the screen.

Figure 6 Accounting Video Display

Clear Accounting Display

The clear accounting display is shown in Figure 7. Note that the coin information is never cleared.

Figure 7 Clear Accounting Video Display

Game Options Menu

The manufacturer's recommended game options are shown in Figure 8. To move the arrow that points to each selectable option, press the left JUMP button. To change the option, press the right JUMP button. All available options are as follows.

COIN VALUE

The coin value option determines the number of coins entering the left or right coin mechanisms, required to play one game. The values available are 1, 2, 3, or 4. For game demonstrations, the FREE PLAY option is also available.

LEFT MACH VALUE

The available left mechanism values are 1, 2, 3, 4, or 5. The chosen value multiplies the coins received in this mechanism by that value. When set to 1, a coin dropped into the left coin mechanism of the coin door has the value of 1 coin. When set to 5, a coin dropped into this mechanism has the value of 5 coins.

RIGHT MACH VALUE

The available right mechanism values are 1, 2, 3, 4, or 5. The chosen value multiplies the coins received in this mechanism by that value. This option makes it possible to receive coins with a higher denomination than the left mechanism.

GAME DIFFICULTY

This option allows you to increase or decrease the difficulty of the game, minus or minus or increase the average game time. When used with the accounting display, you may tune the game for the optimum game time of 2 minutes and 30 seconds by setting this option to EASY, MEDIUM, HARD, or HARDEST.

STARTING LIVES

This option allows you to increase the number of lives per game from 2 to 5. The available options are 3, 4, 5, and 6. Using this option along with the accounting display will allow you to tune the game for an optimum average game time of 2 1/2 to 3 minutes.

EXTRA LIVES

This option allows you to award bonus lives for every 50,000 points scored. This option along with the accounting display will allow you to tune the game for the optimum game time of 2 1/2 to 3 minutes.

RESTORE FACTORY OPTIONS

This option allows you to restore the options to those retained in the game program memory. These factory recommended options are shown in Figure 8.

Figure 8 Game Options Video Display

Test EEROM Display

If the EEROM test passes, the results of the test are shown in Figure 9. Either EEROM integrated circuit 4A or 4B fails, the failed IC will be displayed as shown in Figure 2. However, the message RAM OK will not be displayed.