COMPLEX-X

COMPLEX-X IS HERE!

The E-Prom Kit That Plugs Into -
Oi!, Zookeeper, Electric YoYo, or Space Dungeon

It Plugs Right Into The Board!
No Soldering or Wiring!
Fast Play Action!
Get Ernie Out Of The Reactor
Before He Drowns In Radioactive Soup!
Look Out For Those Nasty Nuclear Bugs!

Manufactured Under License From E.T.I., Inc. By -

A.G.D., Inc.
1985 Friendship Drive
Suite J
El Cajon, CA. 92020
(619) 449-9010
COMPLEX-X Installation Instructions

1. Remove all EPROMS IC 4 through IC 19 and IC 27 from ROM I/O PC board.


3. Remove U 1, U 22, U 29 from ROM I/O board.

4. Replace with jumper plugs provided with kit. Make sure pin 1 is in the proper position. Pin 1 is denoted by notched corner of plug.

5. Remove U 24 and replace with the Pal chip provided with the kit.

6. Remove 4-way joystick, 1 and 2 player buttons, slow and fast draw buttons.

7. Remove control panel lexan. Replace with new lexan provided in kit.

8. Install new 8-way joystick, 1 player, 2 player, and fire buttons provided in the kit.

9. Remove marquee glass. With a razor blade, scrape all paint off glass. Install COMPLEX-X overlay on blank glass using soapy water. Wet the glass lightly with soapy water, peel the protective backing off the COMPLEX-X decal and place the decal on the blank glass. The soapy water will allow you to position the decal properly. Let dry and trim excess. Reinstall COMPLEX-X marquee into game cabinet.
### STANDARD COIN SETTINGS

<table>
<thead>
<tr>
<th>Coin Door Mechanisms</th>
<th>Credit/Money</th>
<th>Standard Setting</th>
<th>Left Coin Slot Multiplier</th>
<th>Center Coin Slot Multiplier</th>
<th>Right Coin Slot Multiplier</th>
<th>Coin Units for Credit</th>
<th>Coin Units for Bonus</th>
<th>Minimum Coin Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>1/25, 4/1</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/50, 3/1, 6/2</td>
<td>02</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>02</td>
<td>04</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/50</td>
<td>03</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>02</td>
<td>04</td>
<td>00</td>
</tr>
<tr>
<td><strong>1 DM, 5 DM</strong></td>
<td>1/10M, 6/50M</td>
<td>04</td>
<td>06</td>
<td>00</td>
<td>01</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>1 Franc, 5 Francs</strong></td>
<td>1/2F, 3/5F ONLY</td>
<td>05</td>
<td>01</td>
<td>16</td>
<td>06</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>25 Cents, 1 Guilder</strong></td>
<td>1/25, 4/1G</td>
<td>06</td>
<td>01</td>
<td>00</td>
<td>04</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>5 Francs, 10 Francs</strong></td>
<td>1/5F, 2/10F</td>
<td>07</td>
<td>01</td>
<td>00</td>
<td>02</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/10F</td>
<td>08</td>
<td>01</td>
<td>00</td>
<td>02</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>1 Franc, 2 Francs</strong></td>
<td>2/1F, 5/2F</td>
<td>09</td>
<td>00</td>
<td>04</td>
<td>01</td>
<td>04</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>1 Unit, 5 Units</strong></td>
<td>1/2, 3/5</td>
<td>10</td>
<td>01</td>
<td>00</td>
<td>06</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>Twin Coin</strong></td>
<td>1/1 Coin</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/2 Coins</td>
<td>03</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

### CUSTOM COIN SETTINGS

<table>
<thead>
<tr>
<th>Coin Door Mechanisms</th>
<th>Credit/Money</th>
<th>Standard Setting</th>
<th>Left Coin Slot Multiplier</th>
<th>Center Coin Slot Multiplier</th>
<th>Right Coin Slot Multiplier</th>
<th>Coin Units for Credit</th>
<th>Coin Units for Bonus</th>
<th>Minimum Coin Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>1/25, 5/1</td>
<td>00</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>2/50, 5/1</td>
<td>00</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>2/50, 4/1</td>
<td>00</td>
<td>01</td>
<td>04</td>
<td>01</td>
<td>01</td>
<td>04</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>1/50, 3/1, 4/1.25</td>
<td>00</td>
<td>03</td>
<td>12</td>
<td>03</td>
<td>04</td>
<td>15</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/50, 3/1, 7/2</td>
<td>00</td>
<td>12</td>
<td>48</td>
<td>12</td>
<td>14</td>
<td>96</td>
<td>24</td>
</tr>
<tr>
<td><strong>20 Cents, 1 Guilder</strong></td>
<td>1/20, 3/50</td>
<td>00</td>
<td>01</td>
<td>00</td>
<td>01</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>25 Cents, 1 Guilder</strong></td>
<td>1/25, 5/1G</td>
<td>00</td>
<td>01</td>
<td>00</td>
<td>04</td>
<td>01</td>
<td>04</td>
<td>00</td>
</tr>
<tr>
<td><strong>100 Lire, 200 Lire</strong></td>
<td>1/200 Lire</td>
<td>00</td>
<td>01</td>
<td>00</td>
<td>02</td>
<td>02</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>Twin Coin</strong></td>
<td>1/3 Coin, 2/5</td>
<td>00</td>
<td>02</td>
<td>00</td>
<td>02</td>
<td>05</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td><strong>1 Unit, 3 Units</strong></td>
<td>1/1, 5/5</td>
<td>00</td>
<td>01</td>
<td>00</td>
<td>05</td>
<td>01</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>1/3, 2/5</td>
<td>00</td>
<td>02</td>
<td>00</td>
<td>10</td>
<td>05</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>
POWER ON/OFF SWITCH, INTERLOCK SWITCHES, MEMORY
PROTECT SWITCH, SELF TEST SWITCH, VOLUME CONTROL,
AND SERVICE OUTLET

To minimize the hazard of electrical shock while servicing the game
a Power On/Off Switch, and two (2) Interlock Switches are pro-
vided. Two (2) Self Test Switches, a Volume Control and a Service
Outlet have also been provided. (See Figures 5 and 6 for location of
Switches).

1 POWER ON/OFF SWITCH, INTERLOCK SWITCHES

A Power ON/OFF Switch is located in the front of the game at the
bottom left side of the cabinet. There are two Power Interlock
Switches, one is located on the inside of the Coin Door, the other
switch is located at the inside rear of the Service Door. This switch
removes all the power from the game without unplugging it from
the wall outlet. Power may be restored for servicing by pulling out
on the Interlock Switch Buttons.

2 MEMORY PROTECT SWITCH

The Memory Protect Switch is used to prevent erroneous writes to
locations in the CMOS RAM which store the location program
variables.

3 SELF TEST SWITCH

There are two (2) Self Test Switches and four (4) positions, located
on the inside of the Coin Door. See Figure 5. The "QIX"™ game is
capable of testing itself and provides data to demonstrate that the
games circuitry and the controls are working properly. For further
information on the Self Test Procedure refer to Section 1.8 and
Figure 1-8.

4 VOLUME CONTROL SETTING

The Volume Control Setting is located on the Data/Sound P. C.
Board, which is on the rear of the Service Door. The volume
increases when turned clockwise as indicated in Figure 1-5.

5 SERVICE OUTLET

A Power Receptacle has been provided to further aid servicing.
The voltage at this receptacle will be the same as the line voltage the
game is set at.

6 ELECTRONIC ACCEPTORS

This game is equipped with the capability of using 12VDC Elec-
tronic Coin Acceptors, such as Third Wave Electronics, Model
TW12 or equivalent. Power for these units may be obtained from
the Coin Entry Lamp terminals which provide 12VDC.

7 COIN METER

This game is also equipped with the capability of using a Coin
Meter. See Illustration below. Connect one lead to the +12VDC supply (available from the Coin
Entry Lamp), another connection from the other lead on the Coin
Meter to Connector J15-13 on the ROM/IO Board.
SELF TEST PROCEDURE

1 GENERAL
The Self Test Procedure is performed using the two (2) Switches located on the inside of the Coin Door, and the Self Test Button and the LED’S on the Video PC Board. (See Figure 1-7).

2 ENTERING INTO THE SELF TEST MODE
To enter the Self Test Mode, press the Advance Sub-Test Switch on the Coin Door or the Self Test Button found near the LED display. All the LED’S should blink on and the Hardware Tests should start. The Diagnostics can be entered at the Location Programming Screen (Section 1.8.16) by pressing the Advance Test Switch on the Coin Door. If a continual test of the Video Board is desired, press the Self Test Button twice to start the Video Test in the Auto Test Mode. In this mode, the machine will continually run the Hardware test until powered off. If the message “OPEN COIN DOOR TO TEST” appears the Coin Door must be opened or a jumper connected across J19, 1-2. This is because the CMOS RAM Test (Section 1.8.6) cannot be performed with the memory protected by the Coin Door Switch.

3 HARDWARE TESTS
These tests are performed in the following order:

<table>
<thead>
<tr>
<th>VIDEO BOARD</th>
<th>DATA BOARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM Checksum</td>
<td>ROM Checksum</td>
</tr>
<tr>
<td>Communications RAM</td>
<td>Local RAM</td>
</tr>
<tr>
<td>CMOS RAM</td>
<td>Communications RAM</td>
</tr>
<tr>
<td>Color RAM</td>
<td>Handshake Test</td>
</tr>
<tr>
<td>Screen RAM</td>
<td></td>
</tr>
</tbody>
</table>

HARDWARE TESTS
All LED values are shown Left to Right. 0 is OFF, 1 is ON and X is dependant upon the test results.

4 VIDEO BOARD ROM CHECKSUM
The ROM Checksum calculates the checksum of each Video ROM and compares it to the checksum stored for that ROM. If it differs from the stored value, the machine will halt and the value of the ROM with the bad checksum will be shown on the LED’S.

LED VALUES: 00000 TEST IN PROGRESS: 000001 FAILURE: 01 XXXX

5 COMMUNICATIONS RAM FROM VIDEO BOARD
The Communications RAM Test determines the stability of memory shared by the two processors by storing a predefined series of numbers throughout the RAM, then reading it back to insure that it was stored correctly.

LED VALUE: 000010
A failure has been detected when the machine halts with the above display. Failure of Communications RAM during Video Board Tests may result from either defective RAM circuitry or failure of the Data Board. To isolate the failure, disconnect the Data Board at P6 and re-enter the test. A failure means trouble in U3, U4 or associated circuits. Passing the retest suggests Data Board problems.

6 VIDEO BOARD CMOS RAM
After saving values in another portion of memory, the CMOS RAM is tested in the same manner as the Communications RAM. If the CMOS RAM passes the test, all of the locations are restored to their previous values.

LED VALUE: 000011
A failure of the CMOS RAM has been detected when the machine halts with the above LED value displayed. If this occurs U85 and U86 or associated decoding should be checked.

7 VIDEO BOARD COLOR RAM
This tests the system Color RAM by storing predefined sequences of numbers in the Color RAM, then reading them back while testing for accuracy.

LED VALUE: 000100
A failure is indicated by the processor halting with the above value displayed on the LED’S. This signifies the need to check U56, U57 and associated multiplexing and decoding.
8 VIDEO BOARD SCREEN RAM

The Screen RAM is tested by writing a pattern to each page on the screen. The results of these writes is then compared to the original pattern. Any discrepancy causes the machine to halt with the LED displaying the faulty RAM.

<table>
<thead>
<tr>
<th>LED VALUE</th>
<th>TEST IN PROGRESS: 00 0101</th>
<th>FAILURE: 1X XXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 0000</td>
<td>U33</td>
<td>11 0000</td>
</tr>
<tr>
<td>10 0001</td>
<td>U32</td>
<td>11 0001</td>
</tr>
<tr>
<td>10 0010</td>
<td>U31</td>
<td>11 0010</td>
</tr>
<tr>
<td>10 0011</td>
<td>U30</td>
<td>11 0011</td>
</tr>
<tr>
<td>10 0100</td>
<td>U29</td>
<td>11 0100</td>
</tr>
<tr>
<td>10 0101</td>
<td>U28</td>
<td>11 0101</td>
</tr>
<tr>
<td>10 0110</td>
<td>U27</td>
<td>11 0110</td>
</tr>
<tr>
<td>10 0111</td>
<td>U26</td>
<td>11 0111</td>
</tr>
<tr>
<td>10 0000</td>
<td>U17</td>
<td>11 1000</td>
</tr>
<tr>
<td>10 1001</td>
<td>U16</td>
<td>11 1001</td>
</tr>
<tr>
<td>10 1010</td>
<td>U15</td>
<td>11 1010</td>
</tr>
<tr>
<td>10 1011</td>
<td>U14</td>
<td>11 1011</td>
</tr>
<tr>
<td>10 1100</td>
<td>U13</td>
<td>11 1100</td>
</tr>
<tr>
<td>10 1101</td>
<td>U12</td>
<td>11 1101</td>
</tr>
<tr>
<td>10 1110</td>
<td>U11</td>
<td>11 1110</td>
</tr>
<tr>
<td>10 1111</td>
<td>U10</td>
<td>11 1111</td>
</tr>
</tbody>
</table>

VIDEO BOARD RAM CHECKSUM

Upon failure of a screen RAM, locate the problem RAM and replace it. If this Diagnostic appears to halt without indicating a RAM failure (00 0101 on LED'S), a failure to begin the next test (Data Hardware) is indicated. The interconnection to the Data Processor must be inplace and the Data Processor must be functional to continue.

1.8.9 DATA/SOUND BOARD SELF TESTS
DATA HARDWARE (ROM CHECKSUM)

The ROM Checksum calculates the checksum of each Data ROM and compares it to the checksum stored for that ROM. If it differs from the stored value, the machine will halt and the value of the ROM with the bad checksum will be shown on the LED'S.

| LED VALUE | TEST IN PROGRESS: 00 0110 | FAILURE: 01 XXXX |

DATA/SOUND BOARD ROM CHECKSUM

If this test fails in the field, the bad ROM will need to be replaced.

10 DATA/SOUND BOARD LOCAL MEMORY

The Data Processor uses a known sequence of numbers to test the bits in its Local Memory. If a bad bit is found the machine will halt with the following display.

| LED VALUE | 00 0111 |

11 COMMUNICATIONS RAM ADDRESSING

The function of this test is to ensure that both the Data and the Video Processor address the Communications RAM in the same manner. The Data Processor requests the Video Processor to fill the RAM with a known pattern then, the Data Processor compares the result to the expected pattern. If it does not match, one of the processors is probably decoding the address incorrectly as the RAM itself was previously tested for stability by the Video Processor. The machine will halt with the following display.

| LED VALUE | 00 1000 |

12 DATA/VIDEO HANDSHAKE

This test ensures that the Data Processor can send priority commands via interrupts to the Video Processor. The Video Processor is halted, then restarted by the data Processor after the proper command acknowledgements are received. The machine will halt with the following display.

| LED VALUE | 00 1001 |

14 ALIGNMENT AND CONVERGENCE TEST

This screen is provided to align the color guns and correct the convergence on the screen. The screen is composed of a red and a green rectangle and white grid. Adjust the screen width and length so that the red rectangle is slightly within the boundaries of the tube. The adjustment is to be made on the center of the lines which make up the rectangle. The corners of the rectangle will extend beyond the shadow mask. The green rectangle defines the normal playfield and so should be visible from the players view point.

A grid of white squares is provided to help detect and correct any convergence problems the tube may have. Adjust the monitor until the squares are of equal size throughout the screen. To advance to the next screen, activate the Advance Test Button on the Coin Door.
15 LOCATION PROGRAMMING SCREEN (LANGUAGE SELECTION)
This screen allows the user to select the language in which the Location Programming and the game will operate. Four (4) languages are provided. Use the Advance Sub-Test Button to move through the offered languages. When the desired language is green, depress the Advance Test Button, to advance to the next screen.

16 LOCATION PROGRAMMING
This screen allows the location to define the difficulty factor for the game. It also allows the location to set a maximum number of credits allowed in the machine prior to a game start up. The user selects the line to be changed by using, the Advance Sub-Test Button until the desired line is changed to green. The value associated with this line is then modified with the UP or DOWN Switches. If the machine is to be reset to the factory settings, use the Advance Sub-Test Button until the reset line is lit in green, then press the UP Switch. The values will be reset and the user will be placed back on the first line for further adjustments. Advance test will move to the next screen at any time. The backup HSTD (High score to date) value is used to reset the high score on the next screen. Its value will initially determine the score needed for a player to have his own initials show with his score in the high scores. The maximum credit defines a limit for the machine, which when crossed will disable the coin slots. This allows the location to set a limit on the amount of games a player will get if there is a line of people waiting. This value ranges from 1 to 99. However, it should not be set so close to 99 that a single coin can overflow the credits issued (maximum 99). A Free Play Mode may be selected by setting maximum credits to 0. The credits per coin are set in the coin slot programming screen.

17 HIGH SCORE TO DATE SCREEN
This screen shows the scores and initials of the players with the ten highest scores. It is used as an audit for the game. To reset the values to the backup HSTD selected on the previous screen, press the UP Switch. This will also set the initials to "TAC". When the UP Button is activated it resets to default scores. To move to the next screen, activate the Advance Test Button on the Coin Door.

18 AUDIT TOTALS
This screen provides the audit totals for the game. Once they are recorded, they may be zeroed by pressing the UP Switch. The following audits are kept.

- Total Credits: The total number of paid credits issued. This total is never zeroed, but it will wrap around to zero when its total reaches 1,000,000. The only time this total can be zeroed is by physically removing the battery or jumper W1, while the power is off.
- Left Coins: The number of coins dropped into the left slot.
- Center Coins: The number of coins dropped in the center slot.
- Right Coins: The number of coins dropped into the right slot.
- Paid Credits: The number of credits issued for coins.
- Awarded Credits: The number of credits awarded by the game.
- % Free Plays: Awarded credits / paid credits + awarded credits * 100
- Minutes Played: Number of minutes the game has been in play mode.
- Minutes Awarded: Number of minutes the game has been in extended or awarded play.
- % Free Time: Awarded minutes / minutes played * 100.
- Average Game (Sec): Minutes played / paid credits + awarded credits * 60
- High Scores: The number of times a player scored high enough to bump someone else from the high score list.

AUDIT TOTALS
The UP Switch is used to zero the audits. To advance to the next screen, activate the Advance Test Button on the Coin Door.

19 COIN SLOT PROGRAMMING
This screen allows the user to either select a standard coinage setting for the game or program his own. If a standard setting is desired, use the UP and DOWN Switch to adjust the coinage setting while it is lit in green. The values for the variable will change as this number is altered. When the right selection is set, use Advance Test to return to the game.
If a non-standard setting is desired, use Advance Sub-Test Switch to move down to the variables so that they may be programmed individually. Once this switch is pressed, the setting number is set to zero to show that the location has supplied their own settings. As the lower variables are unchanged, the user may minimize his effort by first selecting a setting close to the one he desires. Once in the programming mode, the Advance Sub-Test Switch is used to move among the variables. It will also take you back to the standard settings, if you press it by mistake. The UP and DOWN Switches are used to increment or decrement the values. Advance Test Switch will return to the game when pressed.
The coin multiplier tells how many coin units are issued for each coin through a particular slot. Coin units for credit show the number of units necessary before a credit is issued. Coin units for bonus gives the number of units necessary before a bonus credit is issued.
Minimum coin is an optional value which will keep the credits from accumulating until the specified minimum amount of coin units is reached. It is not used in any of the standard settings.

20 CMOS MEMORY FAILURE
If the message "Memory Failure - Service Required" appears on the screen, the CMOS RAM which stores all of the location programming has failed. All the values stored in the RAM are set back to factory defaults. This condition probably indicates a battery failure.