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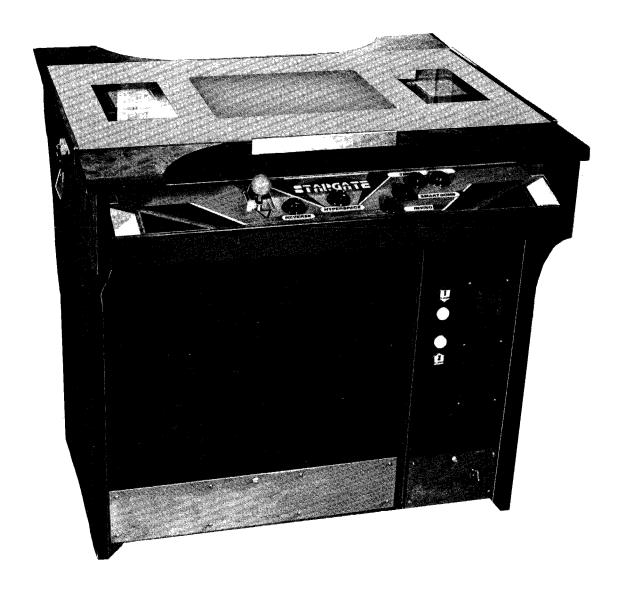
INSTRUCTION MANUAL

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ROM SUMMARY

ROM	PART NO.	DESCRIPTION
STARGATE 1A	A-5343-09700	ROM, 4Kx8
STARGATE 2A	A-5343-09701	ROM, 4Kx8
STARGATE 3A	A-5343-09702	ROM, 4Kx8
STARGATE 4A	A-5343-09703	ROM, 4Kx8
STARGATE 5A	A-5343-09704	ROM, 4Kx8
STARGATE 6A	A-5343-09705	ROM, 4Kx8
STARGATE 7A	A-5343-09706	ROM, 4Kx8
STARGATE 8A	A-5343-09707	ROM, 4Kx8
STARGATE 9A	A-5343-09708	ROM, 4Kx8
STARGATE 10A	A-5343-09709	ROM, 4Kx8
STARGATE 11A	A-5343-09710	ROM, 4Kx8
STARGATE 12A	A-5343-09711	ROM, 4Kx8
Decoder ROM 4 (Horizontal)	A-5342-09694	ROM, 512x8
Decoder ROM 5 (Vertical)	A-5342-09695	ROM, 512x8
Video Sound ROM 2	A-5343-09809	ROM, 2Kx8

INSTALLATION

1. Move the cabinet close to desired location and unlock the upper rear door panel. Remove the door and set it aside.

2. Open two latches and swing open the lower rear door.

3. Check that the fuses on the INSTALLATION

1. Move the table close to desired location and unlock and raise the table top.

2. While supporting the component door, lift two latches and lower the door.

3. Check that five fuses on the power supply and two fuses on the Sound Board are securely installed in their fuse clips. Also check that the 1A line fuse on the power panel is secure in its clips.

4. Unlock the coin door.

5. Check that the following connectors are firmly seated and that no wires are broken or termination pins loose in the connector.

    a. Coin door connector.

    b. Control panel connectors.

    c. Monitor control 6-pin connector and monitor power connector.

    d. Transformer connector at the power panel.

    e. Three connectors on the Power Supply.

    f. Four connectors on the Sound Board.

    g. Five connectors on the CPU/Video Board.

    h. Three connectors on the ROM Board.

    i. Two connectors on the Interface Board.

6. Check that the socketed ICs are firmly seated in their sockets (CPU Video Board -3, ROM Board -12, and Sound Board -2).

7. If it is desired to check or change game adjustments, refer to Game Adjustment procedures which follow.

8. Insert the line cord through the opening on the floor of the cabinet and pull it to its full extension.

9. Swing the component door closed and latch it.

10. Close and lock the table top.

11. Close and lock the coin door.

POWER TURN-ON

This game MUST BE PLUGGED INTO A PROPERLY GROUNDED OUTLET to PREVENT SHOCK HAZARD and to ensure PROPER GAME OPERATION. DO NOT use a "cheater" plug to defeat the ground pin on the line cord, and DO NOT cut off the ground pin. The line voltage must agree with that specified on the back of the cabinet or serious damage to the machine could occur. For low-line voltage applications (105Vac or 200Vac), refer to the power wiring diagram.

1. With the game plugged into a properly grounded outlet, locate the POWER ON/OFF Switch located under the cabinet on the component door side and switch it ON. General illumination should come on and a scanning pattern should appear on the screen as the game sequences through ROM, RAM, and CMOS RAM data checks.

2. If ROM and RAM tests are successful "0" is first indicated on the ROM Board 7-segment Diagnostic Display. A few seconds later the following message is indicated on the monitor:

<div align="center">

INITIAL TEST INDICATES
ALL SYSTEMS GO

</div>

3. If a RAM error is detected, the 7-segment LED first displays a "1" to indicate a RAM failure. Next, the bank number (1, 2, or 3) and finally the chip of the bank (1 to 8). Then there is a pause and the LED display sequence is repeated. Next, another pause occurs and then the CRT displays a "RAM ERROR XX" where X is the bank number and Y is the chip of that bank.

4. If a ROM error is detected, the 7-segment LED first displays a "2" to indicate that it is a ROM failure. Next, the LED displays two numbers which indicate the ROM chip number (01,02,03, . . . ,12). Then there is a pause and the LED display is repeated. Next, another pause occurs and then the CRT displays a "ROM ERROR X" where X indicates the ROM number.

5. If the CRT display shows any RAM or ROM errors, use the above description to identify the faulty chip and then turn power off and replace the chip.

6. If there is no CRT display at power-up:

   a. Open the table top and lower the component door.

   b. Depress the Reset pushbutton on the CPU/Video board and observe the 7-segment LED display on the ROM board to identify any faulty chip.

   c. After indentifying the chip, remove power to the game and replace the faulty chip.

   d. As only one chip at a time is indicated by the testing system, repeat steps c & d until there is a CRT display.

7. Extensive CMOS RAM data integrity checks are performed. With "OPEN COIN DOOR" displayed, check that the batteries on the CPU/Video Board are seated in the battery clips, open the coin door, and then turn power OFF and ON. A display of "FACTORY SETTINGS RESTORED" should appear.

8. Depress ADVANCE or turn the power OFF and ON to get to game over.

<div align="center">

NOTE
A detailed explanation of the CMOS RAM data
integrity checks and system recovery is
provided in Appendix A.

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GAME OPERATION

* Indicates adjustable features.

GAME START - Insert coins - credits are displayed on CRT. With one credit displayed, pressing 1-Player start initiates a *3-ship game. With two credits displayed, pressing 2-Player Start initiates a 2-player, *3-ship game. With two or more credits displayed, pressing 1-Player Start (or four or more credits, pressing 2-Player Start) initiates a *7 ship game.

Player Controls

UP & DOWN Joy Stick - Maneuvers player ship up and down.

REVERSE Switch -   Reverses player ship direction.

THRUST SWITCH -   Controls player ship speed.

FIRE SWITCH -   Activates laser gun.

HYPERSPACE Switch - Warps player ship to another quadrant with chance of possible annihilation.

SMART BOMB Switch - Destroys all alien ships on screen.

INVISO Switch -   While depressed, the player ship with a shield that renders it invisible and invulnerable.

Game Play

Destroy alien ships and missiles. Rescue humanoids and pick them up to collect bonus. Picking up the first humanoid scores 500 points, the second 1000, the third 1500, and all subsequent score 2000.

Going through the STARGATE warps the player ship to an area where a humanoid requires rescue. Passing through the STARGATE forward while carrying *4 humanoids, warps the player ship to an advanced wave and scores appropriate humanoid bonuses. Going through backwards inhibits the warp.

3

BOOKKEEPING AND EVALUATION TOTALS

1. In Game Over mode, open the cashbox and depress the cashbox advance switch. The advance switch located on the coin door can also be used. The CRT should indicate all bookkeeping and evaluation totals. If so, go to step 3, if the CRT display comes up in the ROM test display perform step 2.

2. Continue to depress the cashbox advance switch, stepping the game through test programs for ROMs, RAMs, CMOS RAMs, Color RAMs, Sounds, Switches, and then CRT Test Patterns, of which there are five. The fifth test pattern is a color bar pattern and directly precedes the CRT display of the bookkeeping and evaluation totals.

3. The bookkeeping and evaluation totals appear on the display as in Figure 1.

Clearing Bookkeeping Totals

1. Depress ADVANCE to display Game Adjustments, page 1.

2. Hold Player 1 joystick down to display Game Adjustments, page 2.

3. Operate Player 1 joystick to position cursor on CLEAR BOOKKEEPING TOTALS.

4. Depress Player 1 FIRE.

5. Depress ADVANCE.

BOOKKEEPING TOTALS

LEFT SLOT COINS	4
CENTER SLOT COINS	0
RIGHT SLOT COINS	18
PAID CREDITS	22
EXTRA SHIPS	796
PLAY TIME IN MINUTES	1152
SHIPS PLAYED	2467
TOTAL PLAYS	563
WARPS	90

Figure 1. Bookkeeping Display

GAME ADJUSTMENTS (Figures 2 and 3)

In the Game Over mode open the table top and depress the Advance switch twice to cause a CRT display as shown in Figure 2.

To select and then set functions to the desired values, use the Player 1 UP-DOWN control lever to select the function that is to be changed and then, making sure the coin door is open, use the Player 1 THRUST control to reduce, or the Player 1 FIRE control to increase the value of the selected function. To alternate between adjustments on pages 1 and 2, use the Player 1 UP-DOWN control.

Extra ships, smart bombs, and inviso time are earned as the score obtained by a player exceeds the listed value for this function. If this function is set to the recommended vaue of 10,000 points, with a score of 10,000 points a player will receive one more ship to play with. At a score of 20,000 points another ship will be earned, and so on. If this function is set to 0, its lowest setting, no extra ships are ever awarded. This function can be set to any 1,000 point increment from 0 to 50,000 points.

The basic number of ships awarded for a 1 credit game can be set anywhere from 1 to 20. The recommended number of ships for a 1 credit game is 3.

The basic number of ships awarded for a 2 credit game can be set anywhere from 0 (no 2 credit games) to 50. The recommended number of ships for a 2 credit game is 7.

Pricing of the game is selected with standard settings or with custom settings as shown in Tables 1 & 2. Table 1 lists some common pricing schemes with respect to the coin mechanism to be used and directs the reader to the proper entry in Table 2, which shows what the CRT display should look like to accomplish the desired pricing.

GAME ADJUSTMENT

►EXTRA SHIP EVERY	10000	RECOMMENDED
SHIPS FOR 1 CREDIT GAME	3	RECOMMENDED
SHIPS FOR 2 CREDIT GAME	7	RECOMMENDED
PRICING SELECTION	3	1/QUARTER 4/DOLLAR
LEFT SLOT UNITS	1	
CENTER SLOT UNITS	4	
RIGHT SLOT UNITS	1	
UNITS REQUIRED FOR CREDIT	1	
UNITS REQUIRED FOR BONUS CREDIT	0	
MINIMUM UNITS FOR ANY CREDIT	0	
FREE PLAY	NO	
MORE ADJUSTMENTS		

USE UP—DOWN LEVER TO SELECT ADJUSTMENT
USE THRUST AND FIRE TO CHANGE THE VALUE

PRESS ADVANCE TO EXIT

Figure 2. Game Adjustments, Page 1

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-▶ MASTER DIFFICULTY CONTROL              3  RECOMMENDED
      INITIAL DIFFICULTY                  5  MODERATE
      MAXIMUM DIFFICULTY                 15  MODERATE

   1ST WAVE OF ACCELERATED DIFFICULTY     0
   LAST WAVE OF ACCELERATED DIFFICULTY    0
   DIFFICULTY ACCELERATION RATE           0  MODERATE

   INVISO TIME PER SHIP                  10  RECOMMENDED
   MEN NEEDED TO WARP                     4  RECOMMENDED
   LAST WAVE WARP ALLOWED                15  RECOMMENDED
   LETTERS FOR HIGHEST SCORE NAME        20  RECOMMENDED

   RESTORE FACTORY SETTINGS              NO
   CLEAR BOOKKEEPING TOTALS              NO
   RESET HIGH SCORE TABLE                NO
   AUTO CYCLE                            NO
   SET ATTRACT MODE MESSAGE              NO
   SET HIGHEST SCORE NAME                NO
```

Figure 3. Game Adjustments, Page 2

For standard settings you need change only the PRICING SELECTION. For custom settings, first set PRICING SELECTION to zero and then set the remaining values according to Table 2.

Free play can be set to either "YES" or "NO".

The master difficulty control is pre-programmed for 4 levels of difficulty and can be custom programmed for 1 as desired. The recommended setting of the master difficulty control is 3. If customized difficulty is desired, set the master control to 0 and with the use of the Player 1 UP-DOWN control and Player 1 THRUST and FIRE controls, set each of the 5 variables as desired.

Initial difficulty is the level of play difficulty for the first attack wave of the game and can be set anywhere between 0 (easy) and 30 (most difficult).

Maximum difficulty is the level of difficulty at which difficulty increases between attack waves cease. This can be set anywhere from 0 (very easy) to 99 (very difficult).

The last three adjustments; first wave of accelerated difficulty, last wave of accelerated difficulty, and difficulty acceleration rate; are all inter-related.
The first wave of accelerated difficulty is the point at which the standard difficulty increase rate between attack waves is first stepped up. This can be set to any wave from 1 to 20. The last wave of accelerated difficulty is the point at which the stepped up difficulty increase rate is decreased to the standard difficulty increase rate (exactly the same as it was before it was stepped up). This can be set to any wave from 1 to 99. The difficulty acceleration rate can be adjusted anywhere from 1 to 10. When any of these functions are set to 0, there is no accelerated difficulty.

The amount of "INVISO" time allowed per ship is recommended to be 1 second but can be varied from .05 to 2 seconds in tenth-second increments.

The number of men needed to "WARP" a ship anywhere is recommended as 4, but can be varied from 1 to 9.

The last wave where any "WARPING" of a ship would be allowed can be set anywhere from 1 to 99, but is recommended as 15.

Table 1. Pricing Schemes

COIN DOOR MECHANISM	CREDITS/MONEY	TABLE 2 STANDARD SELECTION/ CUSTOM KEY
Quarter	1/25¢ 5/$1	A
	2/50¢ 5/$1	B
	1/25¢ 4/$1	3
	2/50¢ 4/$1	C
	1/50¢ 3/$1, 4/$1.25	D
	1/50¢ 3/$1, 7/$2	E
	1/50¢ 3/$1, 6/$2	1
	1/50¢	5
1DM	1/1 DM, 6/5 DM	2
20-Cent	1/20¢ 3/50¢	F
1 Franc	1/2F	4
25 Cent,	1/25¢ 4/1G	6
	1/25¢ 5/1G	G
5 Franc	1/5F, 2/10F	7
	1/10F	8
1 Franc	2/1F, 5/2F	2
100 Lire	1/200 Lire	8

Table 2. Pricing Settings

DISPLAY FUNCTIONS	STANDARD SELECTION								CUSTOM KEY									
									A	B	C	D	E	F	G	H	I	J
Pricing Selection	1	2	3	4	5	6	7	8	0	0	0	0	0	0	0	0	0	0
Left Slot units	1	6	1	1	1	1	1	1	1	1	1	3	12	6	1	2	1	2
Center Slot units	4	0	4	16	4	0	0	0	4	4	4	12	48	0	0	0	0	0
Right Slot units	1	1	1	6	1	4	2	2	1	1	1	3	12	15	4	2	5	10
Units per credit	2	1	1	2	2	1	1	2	1	1	1	4	14	5	1	5	1	5
Units required for bonus credit	4	0	0	0	0	0	0	0	4	4	0	15	96	0	4	0	0	0
Minimum units for any credit	0	0	0	0	0	0	0	0	0	2	2	0	24	0	0	0	0	0

Highest Score Signature

The number of letters allowed the highest scoring player to enter their name can be varied from 3 to 20 and is recommended as 20. If objectionable words are entered as the signature name, you can change the lettered entry leaving the highest score the same. See Setting Highest Score Name.

Restoring Factory Settings

1. Position the cursor on RESTORE FACTORY SETTINGS.
2. Depress Player 1 FIRE.
3. Depress ADVANCE.

Resetting High Score Table

1. Position the cursor on RESET HIGH SCORE TABLE.
2. Depress Player 1 FIRE.
3. Depress ADVANCE.

Setting Attract Mode Message

1. Position the cursor on SET ATTRACT MODE MESSAGE.
2. Depress Player 1 FIRE.
3. Depress ADVANCE.
4. Enter up to two lines of your message following instructions on the screen.
5. Depress ADVANCE to terminate process.

NOTE:
To restore the Williams attract mode message,
it is necessary to perform steps 1 through 3
and then turn the game OFF and back ON.

Setting Highest Score Name

1. Position the cursor on SET HIGHEST SCORE NAME.
2. Depress Player 1 FIRE.
3. Depress ADVANCE.
4. Enter new signature, depress ADVANCE to terminate process.

NOTE
An alternate, simpler method enters the factory
highest score signature. In the game over mode,
hold HIGH SCORE RESET depressed. After a few
seconds a sound is produced and the factory
highest score signature has been activated.

DIAGNOSTIC PROCEDURES

Diagnostic procedures are controlled by the AUTO-UP/MANUAL-DOWN and ADVANCE switches on the coin door.

ROM Test

Set the AUTO-UP/MANUAL-DOWN switch to the MANUAL-DOWN position and depress the ADVANCE pushbutton. A ROM test is performed and any ROM failure is first indicated on the ROM Board 7-segment LED display and then on the CRT screen as described in the Power-Up and Reset Tests text.

RAM Test

With ROM test results present on the CRT display, depressing the ADVANCE pushbutton initiates the RAM test. If a RAM failure is detected, it is first indicated on the 7-segment LED display on ther ROM board and then on the CRT display as described in the Power-Up and Reset Tests text. Test scanning will continue if no failures are detected; depress the ADVANCE pushbutton to terminate the test and the CRT display will indicate that no failures were detected.

CMOS RAM Test1ith RAM test results present on the CRT display, depressing the ADVANCE pushbutton initiates the CMOS RAM test. If the test is passed, the 7-segment LED display on the ROM board will read "0" and then the CRT display will read "CMOS RAM TEST PASSED". If a CMOS RAM failure is detected, the 7-segment LED display will read first "3" and then "2", then "3" and then "2", and after these displays the CRT display will read "CMOS RAM FAILURE". In this case the CPU/Video Board needs to be replaced. If an interlock failure is detected, the 7-segment LED display will read first "3" and then "1", the "3" and then "1" and after these displays the CRT display will read "CMOS INTERLOCK FAILURE". If there is an interlock failure detected, first check out all connections to and from the interlock switch including the switch itself and if all of these items check out then replace the CPU/Video Board.

SOUND Test

With the CMOS RAM test completed, depressing the ADVANCE pushbutton initiates the Sound test. At this point the 5 basic sounds of the game are cycled through automatically. Each sound is labeled a "SOUND LINE" by the CRT display. If more than one "SOUND LINE" produces the same sound, check all cable connections to and from the sound board. If all connections check out, replace the sound board and/or the ROM Board and repeat the SOUND test.

SWITCH Test

When the SOUND test has been completed depress the ADVANCE pushbutton to enter the SWITCH test. During this test the CRT displays the name of each switch as it is closed and blank out the name of each switch that is open. The AUTO-UP/MANUAL-DOWN switch is spring loaded to always be in the AUTO-UP position (closed) and therefore will always be printed out on the CRT display. Operate all player panel and coin door switches being sure to operate the ADVANCE pushbutton last, as, when this switch is operated the COLOR RAM test will be entered. If any switch that is operated does not show up on the CRT display, check out all connections to and from the switch for continuity and check the switch contacts for cleanliness. If all cabling and contacts check out, replace the ROM Board for coin switches or the Interface Board for player panel switches and repeat the test.

Color RAM Test

When the SWITCH test has been completed, depress the ADVANCE pushbutton to enter the Color RAM test. At this point the CRT display starts cycling through 8 different colors, dark red, red, light red, dark green, green, light green, dark blue, and blue. If any of these 8 frames have a vertical band through them, this indicates a Color RAM fault. To "clean up" or "get rid of" any vertical bands, replace the CPU/Video board.

Monitor Test Patterns

From the Color Ram test, depressing the ADVANCE pushbutton initiates the MONITOR TEST PATTERNS by placing a form of a CROSS-HATCH pattern on the screen. This pattern can be used to check and adjust the color convergence of the monitor. After the convergence is as desired, depress the ADVANCE pushbutton and the CRT display goes to a red color purity adjustment display. Depress the ADVANCE once more for green purity adjustments and once more for blue purity adjustments. Finally, depress the ADVANCE pushbutton and the CRT display should be a color bar pattern of (from left to right): red, green, blue, black, white, yellow, cyan, and magenta. With the completion of any and all monitor adjustments depressing the ADVANCE pushbutton initiates the transfer to the BOOKKEEPING TOTALS display.

Auto Cycle Mode

1. From the color bar pattern (or from game over with the switch set to AUTO-UP) depress ADVANCE two times to display Game Adjustments page 1.

2. Hold the Player 1 joystick down to advance to the second page of game adjustments.

3. Position the cursor on AUTO CYCLE with the Player 1 joystick and depress Player 1 FIRE.

4. Depress ADVANCE.

5. The system will now sequence through ROM, RAM, and CMOS RAM tests repeatedly. The coin door must be open during Auto Cycle test. If an error is detected, the test is terminated and the failure indication is displayed on the CRT.

6. To terminate the Auto-Cycle test, turn the game OFF and ON.

CMOS RAM Data Test Protocol

The first sub-test of the CMOS RAM data is that of the ATTRACT MODE MESSAGE checksum. If the test does not pass, the factory ATTRACT MODE MESSAGE is restored. Next, the game adjustments are checked and restored to factory settings if an error is found. If game adjustments are found intact, the high score table is checked for any bad entries. Bad entries are replaced with a score of 4,000 points and no initials. If all entries check, the game returns to the Game Over Mode.

If game adjustments are restored to factory settings, the AUDIT TOTALS are checked. If 5 or more audit digits are other than 0-9 (that is hexadecimal A through F) all audit totals are cleared. This is followed by a check of the high score table and the table is reset to factory settings if errors are found. Finally, game adjustments are rechecked and either OPEN COIN DOOR or FACTORY SETTINGS RESTORED is displayed. With the former, open the coin door and turn the game OFF and ON and then FACTORY SETTINGS RESTORED will be displayed. Return to game over by depressing the ADVANCE pushbutton or by turning the game OFF and ON a second time.

POWER ON

ATTRACT MODE MESSAGE? — PASS

FAIL

RESTORE FACTORY MESSAGE

GAME ADJUSTMENTS — PASS

FAIL

RESTORE FACTORY SETTINGS

AUDITS — PASS

FAIL 5 OR MORE HEX A-F

CLEAR AUDITS

HIGH SCORE TABLE — PASS

FAIL

RESET HIGH SCORE TABLE TO FACTORY SETTINGS

GAME ADJUSTMENTS — PASS

FAIL

"OPEN COIN DOOR" DISPLAYED

OPEN COIN DOOR POWER OFF AND ON

HIGH SCORE ENTRIES — PASS

FAIL

BAD ENTRIES REPLACED WITH 4,000 AND NO INITIALS

"INITIAL TESTS INDICATE ALL SYSTEMS GO" DISPLAYED

"FACTORY SETTINGS RESTORED" DISPLAYED

POWER OFF AND ON