

GENERAL INSTRUCTIONS
FOR
OMEGA RACE (DOMESTIC)

INSTALLATION

- I. Unlock and open the coin box door.
- II. Remove four "CABINET LEVELING LEGS" from inside the coin box.
- III. Tip the cabinet to the side and remove the shipping cleats from its bottom.
 - A. Locate the threaded holes - one in each corner - and install the "CABINET LEVELING LEGS" in them.
 - B. Level the cabinet.
 - C. When finished, cabinet should be stable in the upright position.
- IV. Plug the game into 110 Volt, 60 Cycle A.C. wall outlet only.

-----WARNING-----

Game MUST be
properly grounded.

- A. The power ON/OFF switch is located:
 1. UPRIGHT MODEL: On top of the cabinet toward the back.
 2. SIT DOWN MODEL: In the line cord accessory panel assembly near the floor at the rear of the game.
 3. MINI MODEL: In the center of the cabinet back just below the rear access door.
 4. COCKTAIL TABLE MODEL: Underneath the cabinet on Player No. 2's side.

LINE VOLTAGE SAFETY INTERLOCK SWITCHES

Line voltage SAFETY INTERLOCK SWITCHES have been provided for your protection. The locations of these SAFETY INTERLOCK SWITCHES are:

1. UPRIGHT MODEL: Inside the rear of the cabinet on the right side of the rear access door.
2. SIT DOWN MODEL: Inside the front of the cabinet on the right side of the front access door and inside the rear of the cabinet on the left side of the rear access door.
3. MINI MODEL: Inside the rear of the cabinet on the right side of the rear access door.

4. COCKTAIL TABLE MODEL: Inside the cabinet on the hinge side of the coin door.

When the cabinet access door(s) are secured in place, the SAFETY INTERLOCK SWITCH plunger(s) are in a fully depressed condition. The game circuit can function normally.

When any cabinet access door(s) are opened, the SAFETY INTERLOCK SWITCH plunger(s) are in a partially extended condition. This isolates the game circuit from the line voltage.

To restore power to the game circuit with the access door(s) open, gently pull the SAFETY INTERLOCK SWITCH plunger(s) out to the fully extended condition. THIS IS TO BE USED FOR SERVICING THE GAME ONLY!

SELF-TEST

A slide switch is provided to make the game run a "Self-Test" on itself. The SELF-TEST SWITCH is located on the mounting bracket for the left hand coin meter on the back side of the coin box door.

To put the game into the Self-Test mode; the power to the game must be off, then the SELF-TEST SWITCH may be slid to the ON position, and the power to the game turned back on again.

When in the Self-Test mode, the monitor screen will display the results of certain test functions it has run on itself. (These will be discussed in more detail later.)

TO SERVICE THE CONTROL PANEL(S)

1. UPRIGHT MODEL:

- A. The control panel is held in place by two latches, one on the left side and one on the right side of the cabinet.

1. They are spring loaded to provide constant positive pressure on their latch plates.
2. They can be reached through the coin door AFTER turning power to the game off.
3. To release the latches, lift up and toward the center of the control panel.
 - a. Once they are released, unhook them from their latch plates.

B. To remove the control panel:

1. Raise it up and tilt it toward you until you can see the cable behind it.
2. Cradling the control panel between yourself and the cabinet, disconnect it from its cabling.
3. The control panel is now free and can be removed.

II. MINI MODEL:

- A. The control panel is held in place by three latches, one on the right side, one on the left side, and one on the front center.
 - 1. They are spring loaded to provide constant positive pressure on their latch plates.
 - 2. They can be reached through the coin door AFTER turning power off to the game.
 - 3. To release the latches, lift up and toward the center of the control panel.
 - a. Once they are released, unhook them from their latch plates.
- B. To remove the control panel:
 - 1. Raise it up and tilt it toward you until you can see the cable behind it.
 - 2. Cradling the control panel between yourself and the cabinet, disconnect it from its cabling.
 - 3. The control panel is now free and can be removed.

III. COCKTAIL TABLE MODEL:

- A. Each control panel is held in place by several screws, two on the inside of the cabinet and three along the bottom edge of the control panel.
 - 1. Turn the power off to the game.
 - 2. Open the coin box door and release the two latches on the inside of the cabinet up next to the table top.

CAUTION: The left hand latch is very close to the sharp metal edge on the monitor chassis. Be careful not to cut yourself when working the latch.

 - a. Once they're released, unhook them from their latch plates.
 - 3. Grasp the table top in the center above the coin door lifting up and to the side to tilt it open.

CAUTION: Due to the weight of the monitor, EXTREME CARE MUST be taken when opening the cabinet.
 - 4. Remove the screws which secure the control panel in place.
- B. To remove the control panel(s):
 - 1. Disconnect it from its cabling.

2. The control panel is now free and can be removed.

IV. SIT DOWN MODEL:

There are three control panels on the Sit Down model, one at the bottom of the screen which contains the "START GAME" "1 CREDIT" and "2 CREDIT" buttons, one in the right hand arm rest which contains the "THRUST" and "FIRE" buttons, and one in the left hand arm rest which contains the "ROTATE" control.

- A. These control panels are held in place by semi-tamper-proof screws.
- B. Turn the power to the game off.
- C. To remove either arm rest control panel:
 1. Remove the three screws which secure it.
 2. Grasping it at its bottom front edge, lift it up and tilt it to the side until you can see its cabling.
 3. Unplug it from its cabling.
 4. The arm rest control panel is now free and can be removed.
- D. To remove the control panel at the bottom of the screen:

This control panel CAN NOT be disconnected from its wire harness except by unsoldering the wire harness from the switches. For trouble-shooting purposes, however, the control panel can be lowered slightly so that the pins on the back side of the switches can be reached. To do this, proceed as follows:

1. Remove the three screws which secure it. (Make sure you support it as you remove the last of the three screws.)
2. Lower the left hand edge of this control panel and support it on your knees while tilting it toward you to expose the pins at the back of the two switches for trouble-shooting or replacement purposes.

CAUTION: DO NOT pull on the panel to better expose the pins at the backs of the switches. THERE IS NO SLACK IN THIS CABLE!!

SPECIAL NOTE: TO REINSTALL ANY OF THE ABOVE REMOVED ITEMS, REVERSE THE PROCEDURE YOU USED TO REMOVE IT.

REMOVAL OF THE MAIN-DISPLAY-GLASS AND/OR THE T.V. BEZEL ASSEMBLY

I. UPRIGHT MODEL:

NOTE: In order to do this, the control panel MUST be removed first. See the "UPRIGHT MODEL" procedure.

- A. Turn the power to the game off and remove the control panel. This frees the main-display-glass so it can be lifted up.
- B. Grasp the main-display-glass in the bottom center, lift up slightly and pull it toward you about an inch, let it down just far enough so you can get hold of its top edge with your other hand and lift it out of the game.
- C. Remove the triangular shaped pieces of scenery from the left and right hand sides of the cabinet.
- D. Remove the screws which secure the T.V. bezel assembly in place.
- E. The T.V. bezel assembly is now free and can be slid out of the cabinet.
- F. To reinstall the T.V. bezel assembly and the main-display-glass, reverse this procedure.

II. MINI MODEL:

NOTE: In order to do this, the control panel MUST be removed first. See the "MINI MODEL" procedure.

- A. Turn the power off to the game and remove the control panel.
- B. Remove the screws which secure the glass clamping plate.
- C. Lift out the glass clamping plate. This frees the main-display-glass so it can be lifted up.
- D. By putting your finger in the hole in the middle of the main-display-glass support, you can lift it up and out.
- E. Remove the screws which secure the T.V. bezel assembly and lift it out.

NOTE: Use the hole in the center of the main-display-glass support to grasp it.

- F. Reverse this procedure to reinstall the T.V. bezel assembly and the main-display-glass.

III. COCKTAIL TABLE MODEL:

NOTE: This may be done with the table top in the closed or the open position. If you decide to open the table top, TURN THE POWER TO THE GAME OFF FIRST.

- A. Remove the screws which secure the table top glass clamps in place.
- B. Remove the table top glass.
- C. Lift out the T.V. bezel assembly.

- D. To reinstall the T. V. bezel assembly and the table top glass, reverse this procedure.

IV. SIT DOWN MODEL:

- A. Turn the power off to the game.
- B. Loosen the three screws in the control panel at the bottom of the main-display-glass.
- C. Loosen and remove the three screws at the top of the main-display-glass.


CAUTION: DO NOT let the main-display-glass fall forward. Hold it in place with one hand.

- D. Grasp the top edge of the main-display-glass with both hands and lift up until its bottom edge is free of the control panel at its bottom.
- E. Now slide the glass straight down and onto your lap.
- F. Reverse this procedure to reinstall the main-display-glass.

VOLUME CONTROL POTS

The game volume control pots are located on the left hand side of the daughter board as you face it. There are only two pots, one above the other. For adjustment, they may be reached through the rear access door on the UPRIGHT and MINI models and through the front access door on the SIT DOWN models. On the COCKTAIL TABLE models, you will need to open the table top to reach them.

As you face them, the top pot controls the right speaker sounds and the bottom pot controls the left speaker sounds.

To make the sounds louder, turn the wheels on the pots in this direction  as you face them.

To make the sounds less loud, turn the wheels on the pots in this direction  as you face them.

VOLTAGE CONTROL POTS

The voltage control pots are located on the Linear Power Supply P.C. Board. They are preset at the factory and SHOULD NOT be tampered with at all unless the distributors service department is contacted first.

RECORD KEEPING MODE

This mode gives the owner/operator information about game play activity.

You may enter the Record Keeping mode at any time AFTER THE GAME HAS BEEN TURNED ON by sliding the Self-Test switch to the "ON" position. When this is done, the game will react as follows:

If the game is in the Attract mode or Ready-To-Play mode, several seconds (5 to 10) will go by and then it will display the Record Keeping Ledger.

If the game is in the Play mode, it will NOT go into the Record Keeping mode until AFTER the last omegan defender has been destroyed (the game must be over). At this point, several seconds will go by (5 to 10) and then it will display the Record Keeping Ledger.

When in the Record Keeping mode, the T.V. monitor will give the following display:

Any time a coin acceptor switch is tripped, the game will register a "TEST CREDIT" in the Record Keeping ledger but will not advance the coin counting meter.

Pushing the "THRUST" button will set the "CURRENT CREDIT" count to "0". (This is the last line of the display.)

Pushing the "FIRE" button will set the 1 and 2 player high score values to 38,250 points at the same time.

Holding the "1 PLAYER 1 CREDIT" button while at the same time pressing the "1 PLAYER 2 CREDIT" button will set all information in the Record Keeping Mode to zero "0".

To go back to the game playing mode, simply slide the Self-Test switch back to the "OFF" position.

<u>RECORD KEEPING DISPLAY</u>		
COIN CHUTE 1	___	
COIN CHUTE 2	___	
TOTAL CREDITS	___	
TEST CREDITS	___	
	1 CREDIT	2 CREDIT
1 PLAYER GAMES	___	___
*2 PLAYER GAMES	___	___
FIRST FREE SHIP	___	___
SECOND FREE SHIP	___	___
THIRD FREE SHIP	___	___
AVERAGE SCORE	___	___
HIGHEST SCORE	___	___
AVERAGE SEC. PER GAME	___	___
MAXIMUM SEC. PER GAME	___	___
CURRENT CREDIT	___	
* THIS WILL ALWAYS READ ZERO "0" ON THE SIT DOWN MODEL		

SELF-TEST

The Self-Test mode is a special mode made up of four test displays for checking game switches and computer functions. It is the easiest and best way to check for proper operation of the entire game.

You may begin a Self-Test at any time by turning the power to the game off, sliding the Self-Test switch to the "ON" position, and turning the power to the game back on again. Now that the game is in the Self-Test mode, it will react as follows:

THE GAME DISPLAYS THE FOLLOWING "ROM/RAM" CHECK LIST:

```
P      ROM 1  OK
P      ROM 2  OK
P      ROM 3  OK
P      ROM 4  OK

P      RAM 1  OK
P      RAM 2  OK
P      RAM 3  OK

BBU    RAM    OK

V      RAM 1  OK
V      RAM 2  OK
V      RAM 3  OK
V      RAM 4  OK

V      ROM 1  OK
V      ROM 2  OK
```

The entire ROM/RAM check list shown above flashes on and off at regular intervals every few seconds.

If a bad ROM or RAM chip is found by the games internal check system: it is indicated visually by the letters "NG" on the display in place of the letters "OK"; and phonically by "BEEPING" at you from the moment you turn it on.

For instance: if the 7th chip down from the top is found to be bad, "NG" will appear in front of this chip (P RAM 3 NG) and the game will "BEEP" at you 7 times from the moment you turn it on. It will wait a few seconds (10 to 15) after the 7th "BEEP" and repeat the 7 "BEEPS" again.

If you have two chips that were found to be bad by the games internal check system, they would both be shown on the display with the letters "NG" in front of them and the game would "BEEP" at you in a slightly different manner.

For instance: if the 7th and 12th chips down from the top are found to be bad, they would look like this (P RAM 3 NG) and (V RAM 4 NG). In the above case, the "BEEPING" sequence would be as follows:

```
7 "BEEPS",
PAUSE (2 to 5 seconds),
THEN 12 MORE "BEEPS",
LONGER PAUSE (10 to 15 seconds),
THEN REPEATS ABOVE SEQUENCE.
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NOTE: In addition to the "BEEPING", the game will also flash its 1 and 2 credit LED lit push buttons at you in sequence with the "BEEPS" - 7 "BEEPS", 7 "FLASHES" - 12 more "BEEPS", 12 more "FLASHES" - and so on.

These "BEEPING" and "FLASHING" sequences are repeated until the game is turned off and the bad chip(s) are replaced or until the Self-Test switch is turned off.

When there is a bad chip, the game will not advance to the next Self-Test display by pressing the "FIRE" button. All bad chips must be replaced BEFORE the game will advance to the next Self-Test display.

The meaning of each part of this test display is explained below:

P	ROM	1	OK	The "P" stands for PROGRAMMABLE.
P	ROM	2	OK	
P	ROM	3	OK	The "ROM" stands for READ ONLY MEMORY.
P	ROM	4	OK	
				The "1,2,3," etc. is the number of that particular chip.
P	RAM	1	OK	
P	RAM	2	OK	The "OK" means this particular chip is good.
P	RAM	3	NG	
				"BBU" stands for BATTERY BACK UP.
BBU	RAM		OK	
				The "RAM" stands for RANDOM ACCESS MEMORY.
V	RAM	1	OK	
V	RAM	2	OK	The "V" stands for VECTOR.
V	RAM	3	OK	
V	RAM	4	NG	The "NG" stands for NO GOOD.
V	ROM	1	OK	
V	ROM	2	OK	

When in the Self-Test mode, you advance to the next display in the sequence of four by pressing the "FIRE" button one time. Do so now. The illustration on the next page shows you what the next display in the series (SWITCH OPERATION TEST) looks like.

As you move each of the switches indicated below you will observe that the indications change from "HI" to "LOW" or from "LOW" to "HI". If you move a switch and its indication on the monitor fails to change, the switch is either not working, miswired, or disconnected. Check it out thoroughly.

The meaning of each part of this display is also explained in the illustration on the following page.

THE SECOND DISPLAY IN THE SERIES
AND ITS EXPLANATION

TILT SWITCH, mounted on back of coin door.

COIN 1
COIN 2
TILT
P 1 THRU
P 1 FIRE
TEST.

HI — COIN SWITCHES, mounted on back of coin door.
HI — PLAYER NO. 1 THRUST BUTTON.
HI — PLAYER NO. 1 FIRE BUTTON.
LOW — SELF-TEST SWITCH.

P 2 THRU
P 2 FIRE
2 P 1 CR
2 P 2 CR
1 P 1 CR
1 P 2 CR

HI — PLAYER NO. 2 THRUST BUTTON.
HI — PLAYER NO. 2 FIRE BUTTON.
HI — 2 PLAYER 1 CREDIT BUTTON.
HI — 2 PLAYER 2 CREDIT BUTTON.
HI — 1 PLAYER 1 CREDIT BUTTON.
HI — 1 PLAYER 2 CREDIT BUTTON.

NOTE:
P 2 THRU and P 2 FIRE
are only used in the COCKTAIL TABLE model of this game.

NOTE:
2 P 1 CR and 2 P 2 CR
are NOT used in the SIT DOWN model of *THIS* game.

ANGLE 1 2
ANGLE 1 3
ANGLE 1 4
ANGLE 1 5
ANGLE 1 6
ANGLE 1 7

LOW } These ANGLE SWITCHES are controlled by moving the space craft "ROTATE" control in a complete circle.
HI
HI
LOW
LOW
LOW

ANGLE 2 0
ANGLE 2 1
ANGLE 2 2
ANGLE 2 3
ANGLE 2 4
ANGLE 2 5

HI } These ANGLE SWITCHES are only on the COCKTAIL TABLE model of the game. They are controlled by moving the PLAYER NO. 2 "ROTATE" control in a complete circle.
HI
HI
HI
HI

DIPSW1 0
DIPSW1 1
DIPSW1 2
DIPSW1 3
DIPSW1 4
DIPSW1 5
DIPSW1 6
DIPSW1 7

LOW } DIPSWITCH PACK NO. 1 is mounted on the DAUGHTER BOARD. It is the one farthest from the MOTHER BOARD.
LOW
LOW
LOW
HI
LOW
LOW
LOW

DIPSW2 0
DIPSW2 1
DIPSW2 2
DIPSW2 3
DIPSW2 4
DIPSW2 5
DIPSW2 6
DIPSW2 7

HI } DIPSWITCH PACK NO. 2 is also mounted on the DAUGHTER BOARD right below DIPSWITCH PACK NO. 1. It is the one closest to the MOTHER BOARD.
HI
HI
HI
HI
LOW
LOW

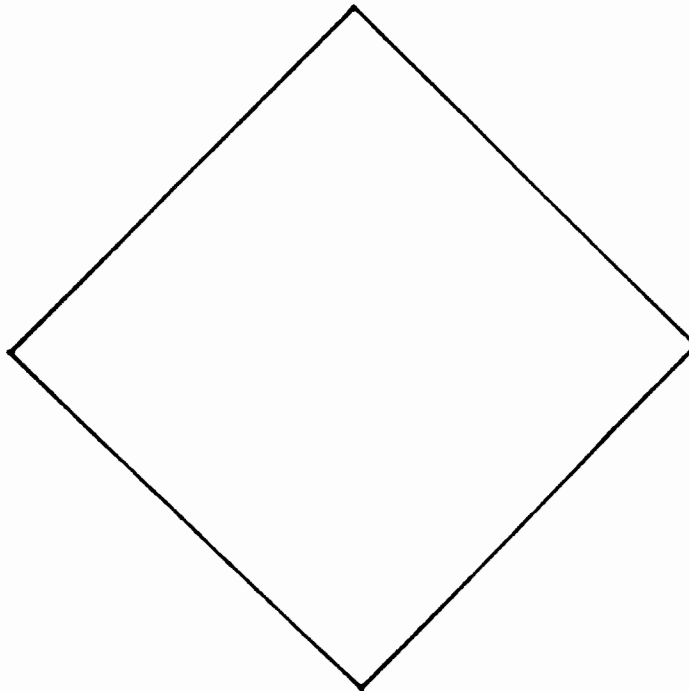
NOTE: An indication of "HI" means that that particular switch is in the "OFF" condition or is a "normally open" switch. An indication of "LOW" means that that particular switch is in the "ON" condition or is a "normally closed" switch.

After having tested all the switches in your game, you are ready to advance to the third display of the series (four all together).

Press the "FIRE" button one time. The following illustration shows you what the next display should look like.

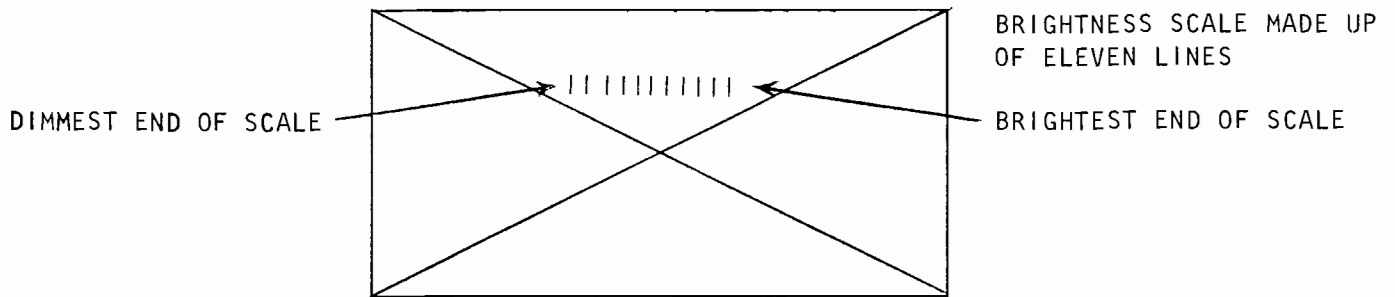
NOTE: This pattern and the two that follow are for use in adjusting or checking the monitors brightness settings and its linearity.

SINGLE DIAMOND PATTERN
WHICH FILLS THE MONITOR SCREEN



Press the "FIRE" button again and you see the last display in the series of four which should look like this:

BOX WITH A CROSS THROUGH IT
AND A BRIGHTNESS SCALE IN THE CENTER



ABOVE DISPLAY FILLS THE MONITOR SCREEN

Pressing the "FIRE" button one more time will cause the monitor screen to go blank and a tone to begin coming from first one of the games speakers and then the other.

The tone is high in pitch to begin with and goes lower over a 2 to 3 second period. When the tone stops at the end of the 2 to 3 second period, the game switches speakers and repeats the tone through the other speaker.

The game will continue alternating back and forth between speakers to aid you in adjusting the volume level heard through each.

TO GET OUT OF THIS VOLUME ADJUSTMENT MODE AND BACK TO THE BEGINING OF THE SELF-TEST MODE, PROCEED AS FOLLOWS:

At least four beeps must come from the games speakers. At any time after those first four beeps are heard, depress and hold down the "FIRE" button. You will hear another two or three beeps while you're holding down the "FIRE" button and then the game will return to the beginning of the Self-Test mode (the ROM/RAM check list).

The other way to get out of the Volume Adjustment mode and back to the beginning of the Self-Test mode is to quickly turn the game "OFF" and back "ON" again.

By sliding the Self-Test switch to the "OFF" position at this time, the game functions and display will return to the T.V. monitor.

NOTE: While in the Self-Test mode, the game functions and display WILL NOT reappear (come back) by just sliding the Self-Test switch to the "OFF" position. You MUST be in the ROM/RAM portion of the five displays BEFORE you can get out of Self-Test and back into game play. Just push the "FIRE" button to cycle through any remaining displays. When you reach the ROM/RAM display portion of the Self-Test mode (assuming the Self-Test switch is already in the "OFF" position), the game will pop out of Self-Test and into normal game functions.

PICTURE SIZE - HORIZONTAL AND VERTICAL

The picture on the monitor may be expanded or contracted in either the horizontal or vertical direction. This function is controled by two pots on the mother board located directly behind the daughter board. They are marked "H" for horizontal and "V" for vertical. You will have to reach around behind the daughter board to make this adjustment.

OMEGA RACE
OPTION SWITCH SETTINGS

//////////////////////////////////// DIP SWITCH #1 //////////////////////////////////////					
1st BONUS SHIP AWARDED AT:					
SW#1	SW#2				
ON	ON	40,000	POINTS		
OFF	ON	50,000	POINTS		
ON	OFF	70,000	POINTS		
OFF	OFF	100,000	POINTS		
2nd AND 3rd BONUS SHIPS AWARDED AT:					
		2nd BONUS SHIP		3rd BONUS SHIP	
SW#3	SW#4				
ON	ON	150,000	POINTS	250,000	POINTS
OFF	ON	250,000	POINTS	500,000	POINTS
ON	OFF	500,000	POINTS	750,000	POINTS
OFF	OFF	750,000	POINTS	1,500,000	POINTS
SHIPS PER CREDIT					
SW#5	SW#6				
ON	ON	1 CREDIT = 2 SHIPS / 2 CREDITS = 4 SHIPS			
OFF	ON	1 CREDIT = 2 SHIPS / 2 CREDITS = 5 SHIPS			
ON	OFF	1 CREDIT = 3 SHIPS / 2 CREDITS = 6 SHIPS			
OFF	OFF	1 CREDIT = 3 SHIPS / 2 CREDITS = 7 SHIPS			
- - - NOT USED - - -					
SW#7 / SW#8					
//////////////////////////////////// DIP SWITCH #2 //////////////////////////////////////					
COINS PER CREDIT					
COIN SWITCH #1 IS CONTROLLED BY SW#1,2,&3					
SW#1	SW#2	SW#3			
OFF	OFF	OFF	1 COIN	1 CREDIT	
ON	OFF	OFF	2 COINS	1 CREDIT	
OFF	ON	OFF	2 COINS	3 CREDITS	
ON	ON	OFF	3 COINS	4 CREDITS	
OFF	OFF	ON	4 COINS	5 CREDITS	
ON	OFF	ON	1 COIN	5 CREDITS	
OFF	ON	ON	1 COIN	3 CREDITS	
ON	ON	ON	1 COIN	2 CREDITS	
COIN SWITCH #2 IS CONTROLLED BY SW#4,5,&6					
SW#4	SW#5	SW#6			
OFF	OFF	OFF	1 COIN	1 CREDIT	
ON	OFF	OFF	2 COINS	1 CREDIT	
OFF	ON	OFF	2 COINS	3 CREDITS	
ON	ON	OFF	3 COINS	4 CREDITS	
OFF	OFF	ON	4 COINS	5 CREDITS	
ON	OFF	ON	1 COIN	5 CREDITS	
OFF	ON	ON	1 COIN	3 CREDITS	
ON	ON	ON	1 COIN	2 CREDITS	
PLAY MODE					
SW#7					
OFF	FREE PLAY (CREDIT REMAINS AT 4)				
ON	COIN PLAY				
COCKTAIL TABLE MODELS					
SW#8					
OFF	THIS IS THE <u>NORMAL</u> POSITION FOR THIS SWITCH IN THE UPRIGHT, MINI, AND SIT DOWN MODELS.				
ON	THIS IS THE <u>NORMAL</u> POSITION FOR THIS SWITCH IN THE COCKTAIL TABLE MODELS. (IT ENABLES THE GAME TO FLIP THE PICTURE WHEN IT IS THE OTHER PLAYERS TURN AND TO RECEIVE INSTRUCTIONS FROM THE SECOND SET OF CONTROLS.)				

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