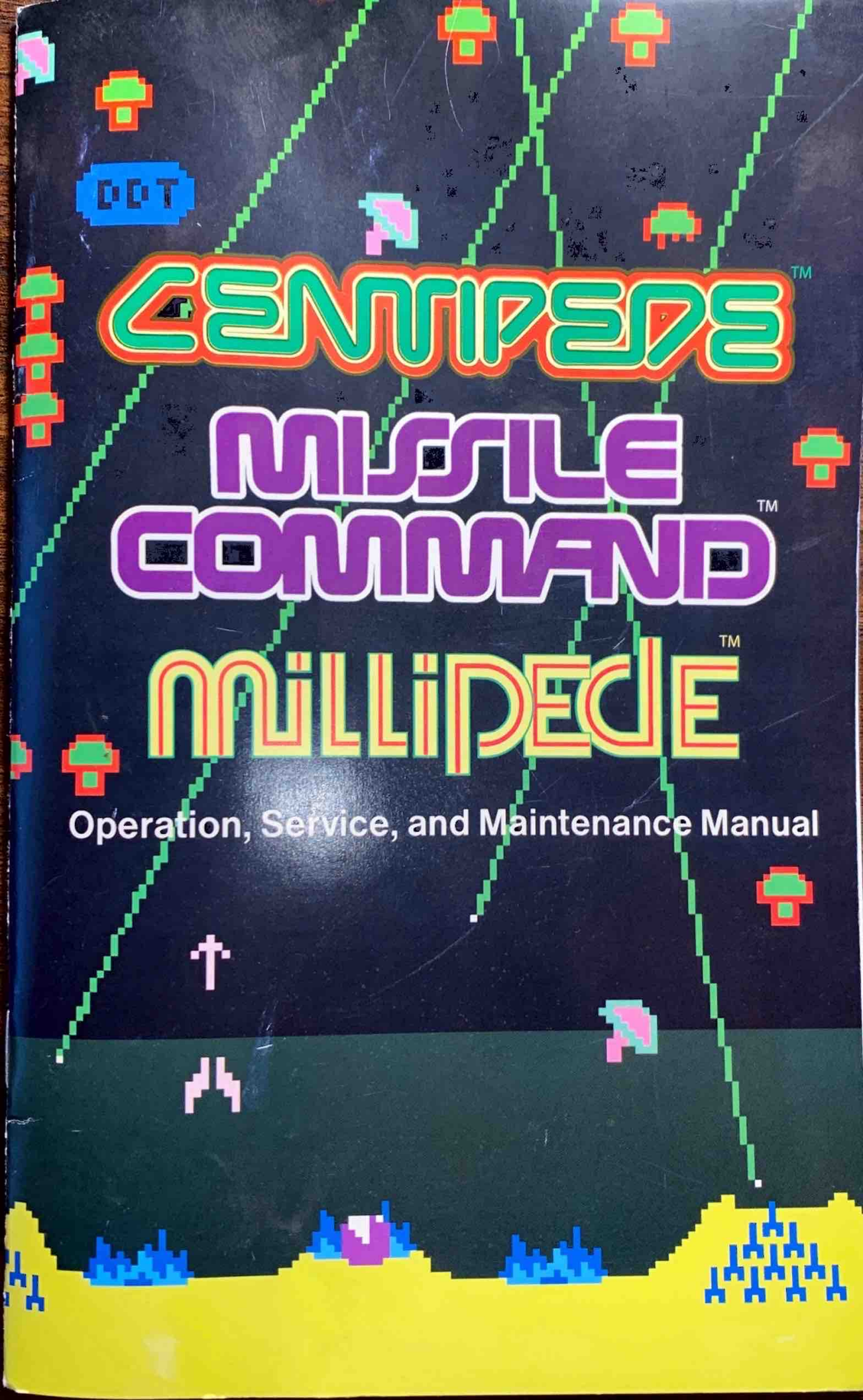
DDT
CENTIPEDE™
MISSILE COMMAND™
MILLIPEDE™
Operation, Service, and Maintenance Manual

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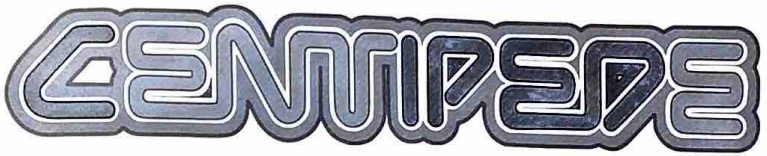

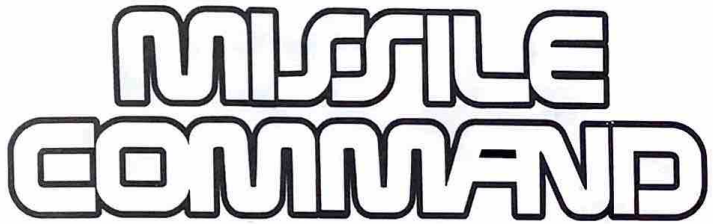

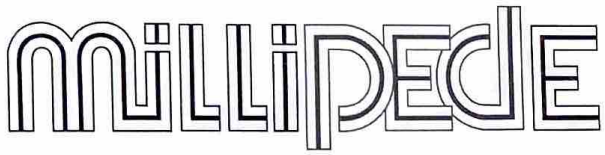

Operation, Maintenance, and Service Manual

ABOUT THIS GAME

This TEAM PLAY Classic Arcade Edition game brings Centipede, Millipede, and Missile Command back together in one cabinet. Players are transported back to the early 1980's to stop the marauding insect invasions of Centipede and Millipede or prevent total world annihilation in the Cold War classic game of armageddon, Missile Command.

The game features a 25" monitor for a more immersive player experience while the highly integrated PCB ensures reliable, trouble-free performance for the operator. All adjustments are accessed via a convenient test menu, rather than through complicated DIP switches. On-board audits track coins in and plays for each game. New coin/credit management software enables buy-in for advanced play with Centipede and Missile Command and permits different pricing for start vs. continue (for example, 1 credit to start, 1/2 credit to continue).

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CENTIPEDE

The fast-moving action includes a variety of creatures dropping down from the top of the screen or flying in from the sides, most of them to attack the player. The player's shooter is represented by a somewhat humanoid head.

The player's goal is to shoot at and destroy as many of these creatures and mushrooms as possible for a high point score, before the player's lives are used up. Players can maneuver their Trak Ball control anywhere with approximately the bottom fifth of the screen. However, they must move around mushrooms since these are fixed, not "transparent" objects. A fire button shoots individual shots upwards, or fires a hail of shots if pressed constantly (only one shot appears on the screen at a time).

THE ENEMIES

The Mushrooms: 1 point

The game begins with a playfield of randomly placed mushrooms. Mushrooms count 1 point when shot, and a player must fire four shots into a mushroom before it is destroyed and disappears. "Poisoned" and partially shot mushrooms add 5 points to the player's score at the end of each life when the screen is resetting.

The Centipede:

At the beginning of each wave, a centipede starts snaking its way across from the center top of the screen. The centipede changes direction when it runs into a mushroom or either the left or right boundaries of the playfield.

When a centipede is shot it breaks into two smaller ones, each with a head. Also, the part of the centipede that was shot leaves a mushroom in its place on the screen. When any centipedes reach the bottom of the screen, they start back up, but remain within the area of the player's shooter (the bottom fifth of the screen). Centipede body parts count 10 points each, and the elusive heads (represented with small eyes on them) are worth 100 points each.

100 points

10 points

When a large centipede (that hasn't been shot yet) reaches the bottom, it releases its tail, and this part changes into a new head. Also, to provide player challenge, if a centipede is still alive when it reaches the bottom, new heads will enter the screen almost at the bottom of the sides. More of these heads will appear as time progresses. A wave ends when all centipede segments are destroyed.

The Spider: 300, 600, or 900 points

The randomly moving spiders also appear in the first wave. The spiders can destroy a player, as well as any mushrooms they move over. This eliminates many mushroom targets for a player. Spiders are worth 300, 600, or 900 points, depending on how close they are to the player when shot.

The Flea: 200 points

In the second wave, the fleas appear when a certain number of mushrooms remains at the bottom of the screen. This number increases as the game progresses, meaning fleas appear more often later on in the game.

Fleas have a value of 200 points when shot, and players must hit them twice to destroy them (the first shot just speeds them up).

The Scorpion: 1000 points

The scorpion enters from either side starting in the fourth wave; it moves at a relatively slow speed. Later, it increases its speed. When shot, a scorpion counts 1000 points, the highest-value target of all.

As it travels across the screen, it "poisons" the mushrooms that it moves over and changes their colors. These mushrooms cause any centipedes that would collide with them to head straight towards the bottom of the screen, rather than continue snaking around. Players can stop a poisoned centipede by shooting its head.

If the players are very skilled and earn at least 60,000 points, two things happen to increase player challenge: the fleas descend at a faster speed and the spiders restrict their movement to a smaller area at the bottom of the screen.

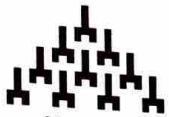
MISSILE COMMAND

Missile Command depicts an Armageddon-style war in which players defend their bases and cities with antiballistic missiles (ABMs). The enemy—the game computer—launches incoming waves of attack missiles. These weapons may be either individual or branching attack missiles. In addition, the enemy occasionally launches missiles from a fast-moving "killer" satellite or from bombers. The enemy also launches "smart" missiles that usually avoid explosions.

Players receive varying numbers of points for intercepting attack missiles, for having unused missile sites still in their bases' arsenals, and for having their cities undamaged after a missile wave.

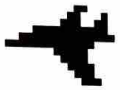
The game begins when either start push button is pressed. The game ends when the player's last city is destroyed.

The Bases:



The three bases—Alpha, Delta, and Omega—each have 10 ABMs ready to be fired. Players must be careful to fire the missiles more or less evenly from among those bases, because no more missiles are granted until the screen resets in preparation for a new wave of attack missiles. If the enemy missiles strike a city or base, the colorful buildings or base will change to the solid color of the landscape.

"Killer" Satellites and Bombers:



During the second wave a "killer" satellite and/or bomber will appear on the screen, moving quickly and launching attack missiles at the bases and cities. Players get bonus points for shooting down the satellites or bombers.

The general approach for getting high point scores is fairly quickly discovered: try to launch your ABMs when the enemy missiles have just appeared at the top of the screen. Then they are clustered together, where one ABM can usually destroy several enemy missiles. In the later more advanced waves, players can lay out a blanket of explosions.

MILLIPEDE

The game action takes place on a playfield filled with mushrooms, flowers, and deadly DDT bombs. The player tries to destroy a variety of insects that drop from the top of the screen or enter from the sides of the screen. The object of the game is to shoot and destroy as many objects as possible for a high point score.

Player controls consist of a Trak-Ball and fire push button. The Trak-Ball controls a bow-shaped shooter. The shooter moves left, right, up, or down but stays in the bottom fifth of the screen. When the player presses FIRE, the shooter emits an arrow that travels upward. The player may fire one or many arrows (by pressing the FIRE button constantly), but only one arrow will appear on the screen at a time.

A player may start a game at an advanced level of play and receive bonus points for starting play at that level.

THE ENEMIES

The Mushrooms:

1 point

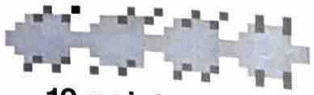
The mushrooms are similar to the mushrooms in Centipede, above. After a period of time, the entire playfield of mushrooms changes. Some mushrooms die and new mushrooms grow where there were none before. A mushroom next to a DDT bomb becomes poisoned.

The Flowers:

Mushrooms which are touched by a beetle turn into a flower. Flowers can not be destroyed by the player.

DDT Bombs:

DDT bombs explode when hit by an arrow. Any object near the bomb is engulfed by the explosion. Insects are worth more than normal if they are destroyed by the explosion (usually three times their normal value).

The Millipede: 

100 points **10 points each**

The millipede behaves like the centipede in Centipede, above. When all *millipede* segments are destroyed the round ends and the screen scrolls down one line. When the millipede with only four segments enters from the top of the screen, the screen will scroll down every two seconds. The only way the player can stop the scrolling screen is to shoot a DDT bomb or destroy the entire millipede. When a millipede runs into a poisoned mushroom, two things happen: his head changes color and he changes direction and falls vertically to the bottom of the screen.

The Spider: **300, 600, 900, or 1200 points**

Spiders appear in any round. They move in a random pattern on the bottom third of the screen. As the player's score increases, the range of the spider decreases, until it is confined to the bottom fifth of the screen. Also, more spiders enter as the game progresses. A spider destroys any mushroom or flower it moves over. The player earns 300, 600, 900, or 1200 points for destroying the spider, depending on the distance the shooter and spider are from each other. If the player's shooter and a spider collide, both are destroyed.

The Earwig: **1000 points**

When a millipede with fewer than eleven segments appears, an earwig enters the screen. As the player earns more points the earwig's speed increases. If an earwig passes over a mushroom, it poisons the mushroom.

The Dragonfly: **500 points**

When a millipede with fewer than ten segments appears, a dragonfly enters at the top of the screen. The dragonfly moves in a zig-zag pattern and its speed increases as the player's score increases. As the dragonfly moves, it leaves a trail of mushrooms behind.

The Mosquito: **400 points**

When a millipede with fewer than nine segments appears, a mosquito enters at the top of the screen and flies in a diagonal pattern. The mosquito's speed increases as the player's score increases. The screen scrolls up one line when the mosquito is shot.

The Beetle: **300 points**

Beetles enter randomly after the first round. They enter from the sides of the screen near the bottom, travel down to the bottom of the screen, and walk at least half way across the bottom. Then the beetle travels up and exits at the side of the screen. If a beetle passes over a mushroom, the mushroom changes into a flower. Depending on an option setting, the number of beetles appearing on the screen and the speed of the beetles increase as the player's score increases. When a beetle is destroyed, the screen scrolls down one row.

The Bee: **200 points**

Bees may fall from the top of the screen during any round. As the bee falls, it leaves a trail of mushrooms behind. The first time the player shoots a bee, it speeds up. The second shot destroys a bee.

The Inchworm: **100 points**

An inchworm may appear when a millipede with fewer than eleven segments appears. The inchworm travels from one side of the screen to the other side. It moves slowly until the player's score reaches 80,000 points. Then it speeds up. If the player destroys the inchworm, all insects will slow down for about three and one-half seconds.

Bombing Raids:

After a millipede of one, three, five, seven, or eleven segments has been destroyed, an insect bombing raid occurs. A raid may have only bees, dragonflies, mosquitoes, or a mixture of all three. When the insect is shot, a point value appears on the screen in its place. With each additional insect hit, 100 points will be added to the previous value, up to 1000 points.

HIGH SCORES

In Centipede and Millipede, only the top three high scores are saved when the game is powered off. The lower five scores for each game are loaded with defaults when the game is turned back on. All five of Missile Command's high scores are saved when the power is off. To clear the high score table, select CLEAR HIGH SCORES from the ADJUSTMENTS menu, described below.

SETTING UP THE GAME

ADJUSTING THE VOLUME

The sound volume is adjusted by the VOL + and VOL - switches on the inside of the coin door.

ADDING CREDITS

Press the SERVICE switch to add credits without affecting the audits.

ALIGNING THE MONITOR

The monitor should not require alignment since it was properly aligned at the factory. However, some adjustments may have changed during shipping or over time.

Image Size:

Use the test screen to adjust the image size. The monitor has controls for height, width, horizontal position, and vertical position. Adjust these controls so that the blue test screen is evenly centered and fills the screen. Remember that the monitor is rotated so the vertical position control actually moves the image left and right.

Contrast and Brightness:

Use the first monitor test screen (the color bars) to adjust the contrast and brightness. Start by turning the contrast control all the way down (counter-clockwise) and the brightness control all the way up (clockwise). Slowly turn the brightness control down until the black band at the top of the screen is truly black (no illumination at all). Then slowly turn the contrast control up until the overall image is at a reasonable level of brightness. Don't turn it up so far that the white text starts to bloom and becomes out of focus.

Color:

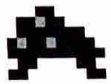
The color bar screen can be used for adjusting the monitor's colors as well. Refer to the monitor manual for instructions on adjusting the monitor's color.

Convergence:

The second monitor test screen is used to check the convergence of the monitor. The white dots should all appear white, with no (or very little) colored fringe. See the monitor manual for instructions on converging the monitor.

DEGAUSSING THE MONITOR

If areas of the screen show impure colors (for instance, if the start-up and test screens are not an even blue) the monitor may need degaussing. Degauss the monitor with a degaussing coil (available from most game parts distributors). With the game operating turn on the degaussing coil and wave it slowly near all sides of the monitor. Keeping the coil energized, slowly move it away from the monitor to a distance of several feet before turning it off. While energized, be sure to keep the degaussing coil away from other monitors and any magnetic storage media like videotapes or floppy disks.



TEST MENU

To enter the test menus press and hold the TEST switch for about a second. You should see a list of items. One of the items is highlighted in red. Change which item is highlighted by either rolling the trackball or pressing the player one and two start switches. Select an item by pressing any of the fire switches. Following is a list of available menu items:

ADJUSTMENTS
- GENERAL ADJUSTS
  - x COINS PER x CREDITS/FREE PLAY
  - x CREDITS TO CONTINUE
  - LEFT COIN MULTIPLIER
  - RIGHT COIN MULTIPLIER
  - xx BONUS CREDITS
  - ENGLISH/GERMAN/FRENCH/SPANISH
  - BUY IN ENABLED/DISABLED
  - EXIT
- CENTIPEDE ADJUSTS
  - EASY/HARD
  - BONUS LIFE EVERY xxK POINTS
  - x LIVES PER GAME
  - EXIT
- MILLIPEDE ADJUSTS
  - SELECT MODE
  - EASY/HARD SPIDER
  - EASY/HARD BEETLE
  - EASY/HARD MILLIPEDE
  - BONUS LIFE EVERY xxK POINTS
  - x LIVES PER GAME
  - EXIT
- MISSILE COMMAND ADJUSTS
  - START WITH x CITIES
  - BONUS CITY AT xxK POINTS
  - EXIT
- CLEAR HIGH SCORES
- FACTORY DEFAULTS
  - ALL SETTINGS TO DEFAULTS
  - EXIT
- EXIT

AUDITS
- SHOW AUDITS
- CLEAR AUDITS

DIAGNOSTICS
- MONITOR ALIGN
- SWITCH TESTS
- DISPLAY NVRAM
- EXIT

EXIT

ADJUSTMENTS

GENERAL ADJUSTS

COINAGE: sets the number of credits awarded per coin. Choices are 1 coin 1 credit, 1 coin 2 credits, 2 coins 1 credit, or free play.

CREDITS TO CONTINUE: sets the number of credits required to continue a game when buy-in is enabled. Choices are 1/2 or 1 credit.

LEFT COIN MULTIPLIER: sets the number of coins awarded for each closure of the left coin switch. For example, if a dollar coin acceptor is mounted on the left coin slot, set this adjustment to 4. Choices are 1, 2, or 4 coins.

RIGHT COIN MULTIPLIER: sets the number of coins awarded for each closure of the right coin switch. Choices are 1, 2, or 4 coins.

BONUS CREDIT: sets the number of bonus credits awarded for a given number of coins. Choices are none, 1 bonus every 2 coins, 1 every 3, 1 every 4, 1 every 5, or 2 every 4 coins.

LANGUAGE: sets the language for the text in each game. Choices are English, German, French, or Spanish.

BUY IN: enables or disables buy-in for Centipede and Missile Command. If enabled, buy-in allows the player to continue a game after losing the last life or city.

CENTIPEDE ADJUSTS

DIFFICULTY: sets the difficulty for Centipede. Choices are EASY or HARD. In the EASY setting, the spider moves slowly up to a 5,000-point score, and then bounces at a higher speed. It also changes direction less often throughout the game than at the hard setting. In the HARD setting the spider moves slowly only for the first 1,000 points, and then speeds up. It also changes direction more often throughout the game. In either setting, the spider always moves at a 45 degree angle or straight up and down.

BONUS LIFE: sets the level at which bonus lives are awarded. Choices are every 10,000 points, every 12,000 points, every 15,000 points, or every 20,000 points.

LIVES PER GAME: selects the number of lives for each player at the start of each game. Choices are 2, 3, 4, or 5 lives.

MILLIPEDE ADJUSTS

SELECT MODE: sets up the select mode, which enables the player to choose a starting level when starting or continuing in Millipede. The starting levels are dependent on the bonus life level. The select mode may be set to OFF (no select mode), 0 PTS (no select mode at start of game, select mode for advanced game only), 0/1x bonus level, 0/1x/2x, or 0/1x/2x/3x.

SPIDER: sets the difficulty of the spider. Choices are EASY or HARD.

BEETLE: sets the difficulty of the beetle. Choices are EASY or HARD.

MILLIPEDE: sets the difficulty of the millipede. Choices are EASY or HARD.

BONUS LIFE: sets the level at which bonus lives are awarded. Choices are none, every 12,000 points, every 15,000 points, or every 20,000 points.

LIVES PER GAME: selects the number of lives for each player at the start of each game. Choices are 2, 3, 4, or 5 lives.

MISSILE COMMAND ADJUSTS

START CITIES: sets the number of cities the player starts with. Choices are 4, 5, 6, or 7.

BONUS CITY: sets the level at which bonus cities are awarded. Choices are none, every 8,000 points, every 10,000 points, every 12,000 points, every 14,000 points, every 15,000 points, every 18,000 points, or every 20,000 points.

CLEAR HIGH SCORES

Sets the high score tables in all games back to their factory defaults.

FACTORY DEFAULTS

ALL SETTINGS TO DEFAULTS: when selected, sets all adjustments to their factory default values. Factory default settings are:

CENTIPEDE:
- EASY
- BONUS LIFE EVERY 12K PTS
- 3 LIVES PER GAME

MILLIPEDE:
- SELECT MODE 0/1x BONUS/2x BONUS
- EASY SPIDER
- EASY BEETLE
- EASY MILLIPEDE
- BONUS LIFE EVERY 15K PTS
- 3 LIVES PER GAME

MISSILE COMMAND
- START WITH 6 CITIES
- BONUS CITY AT 10K PTS

GENERAL:
- 2 COINS 1 CREDIT
- 1 CREDIT TO CONTINUE
- NO BONUS CREDITS
- ENGLISH
- BUY-IN ENABLED

AUDITS

SHOW AUDITS

All audits are displayed, including number of plays for each game and number of coins recorded by each coin switch. The number of coins reported reflects the setting of the coin multiplier adjustments. For example, if the left coin multiplier is set to 4 and 200 coins have passed through the left coin audit will report 800.

CLEAR AUDITS

Resets all audits to zero.

DIAGNOSTICS

MONITOR ALIGN

Two alignment screens are provided which allow adjustment of the monitor. The first provides bands of color. The second provides a screen full of evenly spaced white dots. Press any fire switch to advance through the screens.

SWITCH TEST

The names of all of the switches are displayed. Open switches appear in white, closed switches appear in red. An animating spider is controlled by the trackball. Pressing any fire switch flips which trackball controls the spider (player one or player two). Additionally, the four signals returned by the trackball are reported as well, which eases diagnosis of trackball problems. Press the TEST switch to exit.

DISPLAY NVRAM

The contents of the non-volatile RAM are displayed.

PRINTED CIRCUIT BOARD

This Classic Arcade Edition game uses the latest in programmable logic technology to provide a faithful reproduction of the original games while offering the high reliability of modern circuit design and components. The board conforms to the JAMMA standard pin-out with the exception that the trackball signals are connected where the joysticks would have been.

JAMMA connector

solder side			parts side
GND	A	1	GND
GND	B	2	GND
+5VDC	C	3	+5VDC
+5VDC	D	4	+5VDC
n.c.	E	5	n.c.
+12VDC	F	6	+12VDC
	<keyway>		
n.c.	J	8	COIN COUNTER
n.c.	K	9	n.c.
SPKR-	L	10	SPKR+
n.c.	M	11	n.c.
GREEN	N	12	RED
CSYNC	P	13	BLUE
SERVICE	R	14	VIDEO GND
n.c.	S	15	TEST
COIN 2	T	16	COIN 1
PLR 2 START	U	17	PLR 1 START
PLR 2 HCLK	V	18	PLR 1 HCLK
PLR 2 VDIR	W	19	PLR 1 VDIR
PLR 2 HDIR	X	20	PLR 1 HDIR
PLR 2 VCLK	Y	21	PLR 1 VCLK
PLR 2 FIRE 1	Z	22	PLR 1 FIRE 1
PLR 2 FIRE 2	a	23	PLR 1 FIRE 2
PLR 2 FIRE 3	b	24	PLR 1 FIRE 3
n.c.	c	25	n.c.
n.c.	d	26	n.c.
GND	e	27	GND
GND	f	28	GND

The player 2 controls (Trak-Ball and fire inputs) are only present on the cocktail table game.

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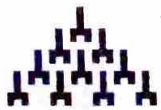

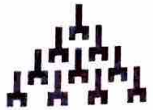

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