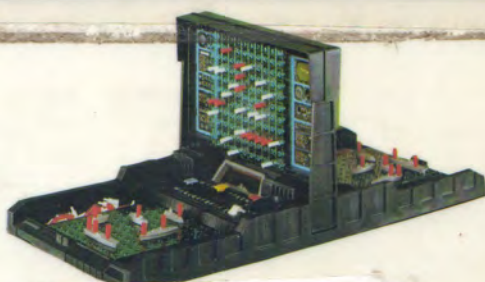


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MICROCOMPUTER- CONTROLLED TOYS & GAMES & HOW THEY WORK

BY VAN WATERFORD



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Preface

This book was great fun to write. Manufacturers (listed below) willingly loaned me many of their games to play with so that I could experience the real excitement of dealing with computerized games. Their extensive contributions made the writing more "real," and you benefit from their generosity.

Because there are so many games on the market and an evaluation of "good/better/best" can only justifiably be done by a group of users rather than by one author, the games described have not been rated.

When you read this book, some games may have been taken off the market and others will have been added. That's the nature of this highly competitive and flexible marketplace. I hope that the games described in this book will give you an idea of what computer technology can accomplish to make your leisure time more interesting and exciting.

Thanks to the following companies:

Activision	Milton Bradley
Bandai Electronics	Parker Brothers
Entex Electronics	Precisa Products
Fidelity Electronics	Selchow & Righter
GTE Products Corp.	Tomy Corp.
Ideal Toy Corp.	Tryom Inc.
Mattel Electronics	Vanity Fair
Mego Corp.	

Introduction

This book deals with a large number of computerized (electronic) games from a variety of well known and lesser known manufacturers. The common denominator of all these games is “the challenge of beating an electronic (computer) opponent.”

Chapter 1 is an introduction to computer chips and provides background into the development of computerized games and the electronics that makes them work.

To make sense out of the vast array of games on the market, this book is divided into different sections by type of game.

Chapter 2 deals with video games, games that utilize a master component connected to your TV set and cartridges for each game, and with nonvideo cartridge games that use a self-contained display and a variety of game cartridges.

Board Games, covered in Chapter 3, are divided into two types: chess, checkers, and backgammon games and *other* strategy games utilizing a board. In *Gargoyles & Goblins*, for example, the game board is the battlefield of a planet. In *The Generals* game, the board serves as a battlefield between two players. The board in *STOP THIEF* is a city block of buildings, streets, and subway stations. Milton Bradley’s *Plus One* uses a four-sided computer that is placed on the game board.

Chapter 4 deals with road games in which “your car” competes with other computer-controlled vehicles.

Chapter 5 discusses games of chance (gambling), such as gin rummy, blackjack, and poker.

Chapter 6 covers challenging, or mind-baffling games. There's a wide variety of games in this category, from written word games to games of logic and strategic planning, that test your concentration, challenge your logical deduction, and test your intelligence and knowledge.

Chapter 7 deals with war games in which you match wits with computer-controlled alien space warships.

Chapter 8 covers educational games, computer-controlled learning centers that help children learn subjects, such as math and reading.

Chapter 9 discusses sports games. A large number of games cover all the favorite sports: baseball, football, basketball, tennis, soccer, hockey, bowling, pool, and boxing.

Chapter 10 covers the multifunction games. These are games that offer a variety of different games in one package. Parker Brothers' MERLIN, for example, has Tic-Tac-Toe, Music Machine, Echo, Blackjack 13, Magic Square, and Mindbender. The Electronic Game Machine 2, from the Hirsch Co., offers Shooting Gallery, Grand Prix, Blackjack, Code Hunter, and Sub Hunt. Mego's Fabulous Fred has 10 different games programmed in its computer.

Chapter 11 deals with miscellaneous games, including Pinball, a Gunfighter Game, Swat Swat the Mosquito, and Dungeons & Dragons.

People have played games since time in memorial and will continue to do so. Today, toys and games bleep, hiss and ping, and as long as their batteries operate, they seldom stay still. The sounds of the '80s are playing loud and clear: electronic toys and games are run by computers no bigger than a package of chewing gum. These games and toys come in all sizes and shapes. There are handheld gizmos that play football; a multicolored disk that challenges eye, ear, and hand coordination; and TV screens that are lit up with galactic wars.

It all started in 1972 when a man named Bushnell placed a coin-operated table-tennis game, Pong, in a bar in Sunnyvale, California. The machine ceased working after two days, its coin box jammed with coins. Since then, TV video games have taken off like rockets, followed by nonvideo handheld games. These are the games whose color images try your gambling instincts at blackjack, your capabil

ity to destroy an enemy tank, or your patience and fortitude in finding your way through a maze.

Over the last six years, leisure time electronics has exploded into a \$1 billion business. The market includes two categories of games: electronic video games and nonvideo-type games. The first category brought in over \$300 million in 1980; the latter over \$800 million. Total toy retail sales for 1980 surpassed \$7 billion, of which games and puzzles accounted for 30 percent.

People are playing more games than ever before. Experts believe that it has to do with our increasingly complex society. Said Aldous Huxley once, "With their simple and unequivocal rules, games are like so many islands of order in the untidy chaos of experience." Electronic games have played a significant role in this resurgent interest in game playing.

Trademark Notices

The following trademarks, in alphabetical order by company, are mentioned in this book:

ACTIVISION INC: Activision, Dragster, Fishing Derby, Kaboom, and Laser Blast.

APPLIED CONCEPTS: Borchek Edition Master Checkers, Borchek Encore Master Checkers, and Boris Diplomat.

ATARI[®]: Adventure game program, Air-Sea Battle game program, Backgammon game program, Basketball game program, Bowling game program, Breakout game program, Canyon Bomber game program, Casino game program, Codebreaker game program, Combat game program, Dodgem, Flag Capture game program, Golf game program, Human Cannonball game program, Indy 500 game program, Jet Shooter, Match Wits With Us game program, Miniature Golf game program, Night Driver game program, Number Cruncher, Outlaw[®] game program, Scoop Ball, Skydiver game program, Slot Machine game program, Slot Racers game program, Space Invaders game program, Space War game program, Starship game program, Street Racer game program, Superman game program, Surround game program, Video Chess game program, Video Computer System, and Video Olympics game program.

BALLY CORPORATION: Bally Arcade Plus.

COLECO INDUSTRIES: Alien Attack, Bowlatronic, Electronic

Learning Machine, Electronic Quarterback, Head to Head Basketball, Head to Head Boxing, Head to Head Hockey, Head to Head Soccer, Magic Touch, Quiz Wiz, Swat Swat the Mosquito, and Total Control 4.

DC COMICS INC.: Daily Planet, Lex Luthor, Kryptonite, and Lois Lane.

ENTEX ELECTRONICS: Electronic Galaxian 2, One-on-One, Raise the Devil, and Space Invader.

FIDELITY ELECTRONICS: Backgammon Challenger®, Bridge Challenger®, Checker Challenger®, and Sensory Chess Challenger®.

HIRSCH CO., INC: Electronic Game Machine 2, Electronic Soccer 2, Hockey 2, Sports Center, and Wizard.

IDEAL TOY CORPORATION: Electronic Detective®, Gargoyles & Goblins, and The Generals®.

KENNER ELECTRONICS: Redline.

MATTEL ELECTRONICS: Armor Battle, Brain Baffler, Build-A-Word, Children's Discovery System, Computer Gin, Concussion I, Concussion II, Copy That, Dungeons & Dragons, Flash Word, Go Hang, Intellivision, Invisible Alien Neutralizer, Math Fun, Sea Battle, Space Battle, Third Degree Flash Word, and Word Fun.

MEGO CORPORATION: Fabulous Fred, Fireman Fireman, Flag Man, Space Attack, The Exterminator, Time Out, and Toss Up.

MILTON BRADLEY: Big Trak, Comp IV®, Connect Four, Microvision, Mindbuster, Plus One, Pocket Simon, Sea Duel, Simon, and Super Simon.

NATIONAL SEMICONDUCTOR: Cops, Digitalker, MICROBUS, Microwire, and TRI-STATE.

PARKER BROTHERS: BANK SHOT, Electronic Crime Scanner, MERLIN, SPLIT SECOND, STOP THIEF®, and WILDFIRE. Used by permission.

SEARS: Tele-Game Video Arcade®.

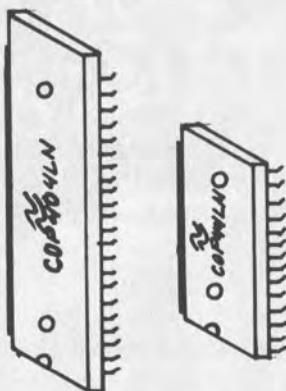
SELCHOW & RIGHTER: LEXOR, Reader's Digest Q & A, Scrabble®, Scrabble® brand Crossword, Scrabble® brand LEXOR, and Scrabble® brand Sensor.

TIGER ELECTRONIC TOYS: Finger Bowl, K28 talking learning computer, Owly, Playmaker, and Talking Picture Book.

TOMY CORP: Tomytronic.

TRYOM INC.: Omar Backgammon.

Chapter 1



Computer Chips

Tiny computer components, called semiconductor integrated circuits (ICs), have made an amazing array of sophisticated toys and games possible. Electronic circuitry has replaced a generation of wind-up mechanical devices in today's electronic toys, providing them with computer brains that bring life to their performance. Computer-controlled toys can play games of strategy, test your memory or dexterity, and even talk clearly and naturally. Even the most skilled players regularly go down in defeat at the hands of these electronic foes.

Today's electronic toys and games by far out perform the first electronic games introduced in 1977. Then, handheld games could produce only the most elementary sounds. Displays were simplistic, and player control was limited. Now, sounds are more realistic, displays are larger and more lifelike, and you have more extensive control of the game.

The tiny electronic circuits are to today's toys and games what plastic was to toys in the 1950s. They have stimulated a rapidly growing demand for electronic toys and games. With this demand, the need has evolved for a source of technologically superior components available in high volume, at low cost, and in accordance with extremely demanding manufacturing schedules.

Today's games of strategy offer great challenges to you, because they are computer controlled, and games of chance are more

random. More game functions are performed simultaneously and at higher speeds, placing greater demands on your skills.

Speech synthesis devices, such as National Semiconductor's Digitalker, can speak in a natural sounding man's, woman's, or child's voice and make informative games a widespread reality. With speech, games have the ability to explain instructions and rules to players or declare when a game has been won or lost. And, by the end of this decade, virtually all these leisure time products will have the capability of speech recognition, allowing you to talk back to your games.

MICROCONTROLLERS

The source of this highly advanced intelligence is a tiny integrated circuit called a *microcontroller*; the brain of the game. It processes the information you enter. Table 1-1 lists ways in which microcontrollers are used. National Semiconductor's COPS mi-

Table 1-1. Microcontroller Applications.

ROM ½ K - 1K	1K - 2K	2K - 4K
RAM 32 × 4 - 64 × 4	64 × 4 - 128 × 4	128 × 4 - 256 × 4
Follow Me Toy	Digitally Tuned Radio	Scanner Radio
Antenna Rotor	Lawn Sprinkler	CATV Central
TV Remote Control	Christmas Bells	Bowling Game
Sewing Machine	Cable TV Set Top Unit	Dual Oven Control
Power Tools	Jogging Monitor	Scales
Garage Door	Heart Rate Blood	Security System
Waterbed Heater	Pressure Monitor	Electronic Organ
Thermometer	2-Cylinder	Jukebox
Burner Control	Ignition System	Dishwasher
(Gas Pilot)	Bowling Game	Calculator
Camera Aperture	Basketball Game	Cash Register
Fan Control	Exercycle	Industrial Timer
Food Processor	Stove Top Controller	CB Radio
Feature Phone	Thermal Oven	Tach and Dwell Meter
Scales	Controller	Enunciator Panel
Lawnmower	Soccer Game	Postal Machine
Appliance Timer	Football Game	Washing Machine
Phone Dialer	Vacuum Cleaner	Dryer Control
Darkroom Timer	Coin Changer	Elevator Control
Doorbell	Coin Unit (Vending)	Traffic Control
Jacks	Bus Ticketing System	Gas Pump
Cruise Control	Power Tools	
Red Light-Green Light	Scales	
CATV Set Top	Microwave Oven	
	Set Back Thermostat	
	Security System	
	Doorbell	
	Video Cassette	
	Phono Turntable	
	Programmable Car	
	Darkroom Timer	
	Personality Computer	
	Telephone Line Car	
	Phone Dialer	
	Scales	
	Light Dimmer	
	Dart Board	
	Air Conditioner	
	Pinball Machine	
	Doorlock	
	Voice Synthesizer Control	
	Emergency Beacon	
	Office Copier	
	Utility Meter	
	Taxi Meter	

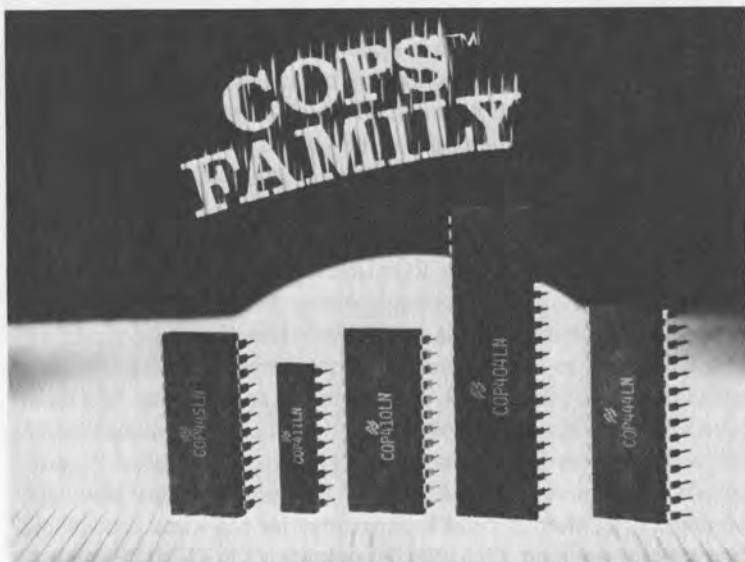


Fig. 1-1. COPS family of microcontrollers (courtesy National Semiconductor).

microcontrollers are a good example (Fig. 1-1). They need only low power to operate and add efficiency and versatility to a game. Used in many games and toys, each member of National Semiconductor's COP series of single-chip microcontrollers is a complete "computer-on-a-chip." (A *chip* is a very small piece of semiconductor material, normally silicon, on which electronic components are formed.) The microcontroller contains all system timing, internal logic, ROM (read-only memory) in which information is stored permanently, RAM (random-access memory) that stores information retrievable at any time, and input-output (I/O) necessary to implement dedicated control functions.

This microcontroller family allows the game manufacturer to specify the optimum device for use in particular application. The flexible I/O configuration of the COP400 microcontrollers allows them to be interfaced to and drive a wide range of devices, using a minimal amount of external parts.

National Semiconductor recently introduced a number of new microcontrollers, used in games produced in 1981. Fabricated using CMOS technology, the new COP421C contains all the system timing, internal logic, ROM, RAM, and I/O necessary to implement dedicated control functions. The device has a low-power dissipation, typically 50 microwatts, and includes a power-saving "idle"

state, with power up and down under software control. In a power loss situation, battery backup enables the device to turn off, remember where it was, and turn back on, taking up where it left off. The vectored interrupt, plus restart, and the three-level subroutine stack featured on the device allow the game manufacturer to achieve program efficiency. Additionally, the programmable I/O ports reduce the amount of external hardware required and provide drive characteristics compatible with the manufacturer's external circuitry. The COP420C is MICROBUS compatible, which allows it to function as a peripheral microprocessor device, exchanging data and commands with the host computer in less than 1 microsecond. The COP420C is also Microwire compatible, enabling the game manufacturer to add LCD, A/D conversion, and external data memory (RAM, ROM, or PROM), as well as frequency measurement and control. The device features single-supply operation (2.4-6.0 volts) and 15-microsecond instruction time plus software selectable oscillators, an internal time-base counter for real-time processing, general-purpose and TRI-STATE outputs, TTL/CMOS compatibility, and LED direct-drive outputs.

The new COP444L uses low-power, N-channel silicon gate technology. It dissipates 55 milliwatts of power at 5-volt operation, and features true vectored interrupt, plus restart. The COP444L is housed in a 28-lead dual in-line package, has 23 I/O lines, and contains $2K \times 8$ bits of ROM and 128×4 bits of RAM.

Table 1-2 offers an overview of the different microcontrollers available from National Semiconductor. Figure 1-2 illustrates the development of various microcontrollers.

INTERACTION OF MICROCONTROLLER AND TOY COMPONENTS

In a typical game setup the microcontroller and the keyboard interact, and the results are either displayed on the display panel or are expressed audibly (Fig. 1-3).

The microcontroller is related to a radio controller and clock. Its workings are illustrated in detail in Fig. 1-4.

The DS8907 synthesizer uses a 4.0-megahertz crystal to provide the time base for frequency synthesis, the 500-kilohertz time base for operation of the COP420L microcontroller, and the 50-hertz signal for the timekeeping function.

An unswitched 5-volt supply goes to the V_{ccm} pin of the synthesizer for operation of the oscillator and divide down for the 500-kilohertz and 50-hertz signals. It also provides V_{cc} for the

Table 1-2. COP400 Microcontroller Family Guide.

MEMORY	Specifications	COP		ROMless Devices		Single-Chip Microcontrollers										
		402	402M	404L	up to 1024 ext.	up to 2048 ext.	410L	411L	420	420L	420C	421	421L	421C	444L	445L
MEMORY	ROM x 8				64	128	512		1024			1024			2048	
	RAM x 4				64	128	32*		64*			64*			128*	
INPUTS	Inputs				4		0		4			0			4	0
	Bidirectional TRI-STATE™ I/O				8		8		8			8			8	
OUTPUTS	Bidirectional I/O				4		4	3	4			4			4	4
	Outputs				4		4	2	4			4			4	4
GENERAL	Serial I/O and External Event Counter	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	SIO	Yes	SIO	Yes	SIO	Yes
	Interrupt	Yes	No	Yes			No		Yes			No		Yes	No	Yes
GENERAL	Stack Levels				3		2		3			3			3	
	MICROBUS™ Option	No	Yes	No			No		Yes	No	Yes	No		Yes	No	No
POWER/PACK	Instruction Cycle (μs)				4	16	16		4	16	4	4	16	4	16	16
	Supply Voltage				4.5-6.3	4.5-9.5	4.5-6.3***		4.5-6.3	4.5-6.3***	2.4-6.0	4.5-6.3	4.5-6.3***	2.4-6.0	4.5-6.3***	4.5-6.3***
POWER/PACK	Supply Current (mA)				30	15	5		30	8	**	30	8	**	11	
	Package Size (pins)				40		24	20	28			24		28	24	28

*RAM keep-alive option (except 420C/421C). **Fast: 800 μA. Slow: 35 μA. Sleep: 15 μA. ***4.5-9.5V optionally available

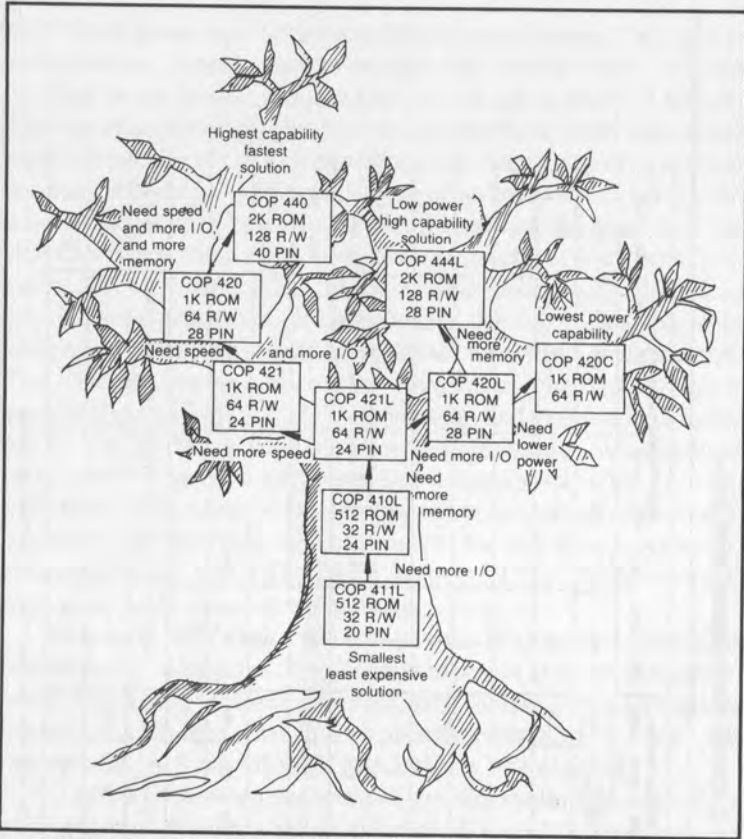


Fig. 1-2. Development of the COPS family tree of microcontrollers (courtesy National Semiconductor).

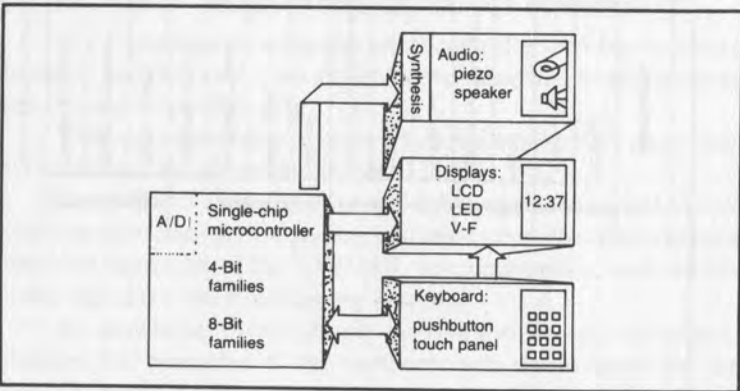


Fig. 1-3. Typical electronic controller (courtesy National Semiconductor).

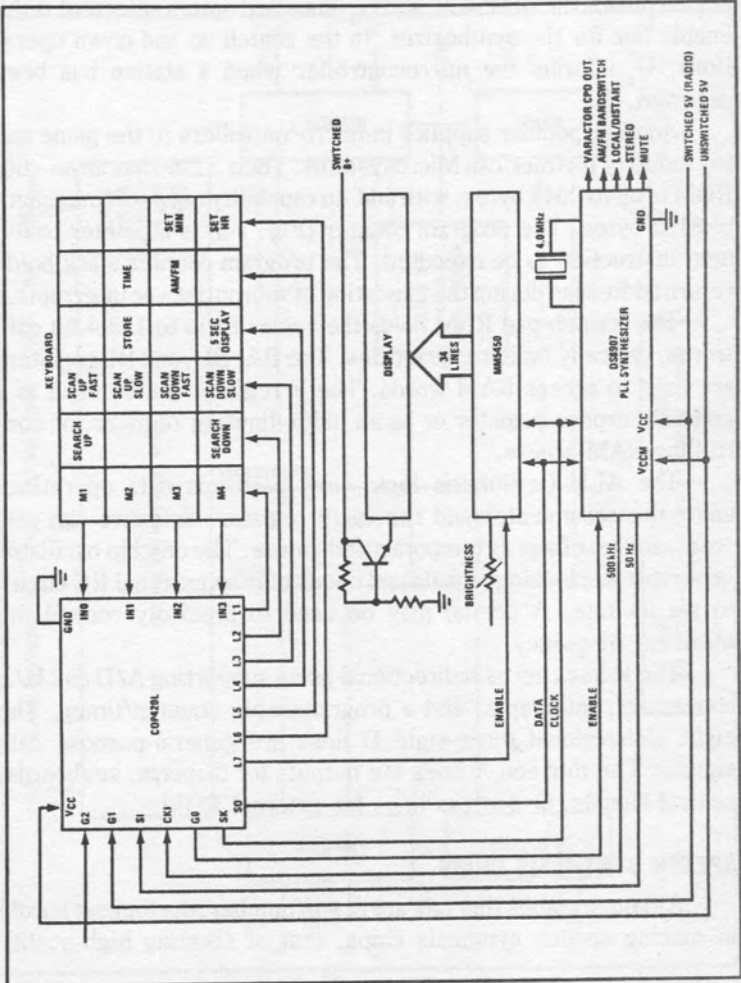


Fig. 1-4. Electronically tuned radio system (courtesy National Semiconductor).

microcontroller, so the timekeeping channel storage and last station selected data are not lost when the ignition is turned off.

A switched 5-volt supply that goes high when the radio is turned on goes to the V_{cc} pin of the microcontroller for the frequency-generating circuitry and to the G1 I/O pin of the COP420L.

L_1 through L_6 are outputs to the keyboard (push-pull options selected), and IN_0 through IN_3 are the keyboard inputs (pull up to V_{cc} and high trip levels selected).

SK provides the clock and SO provides the data to the MM5450 display driver with serial input and to the PLL synthesizer. L_7 is the enable pin for the MM5450, and G_0 (standard option selected) is the enable line for the synthesizer. In the search up and down operations, G_2 informs the microcontroller when a station has been detected.

Another popular supplier in microcontrollers to the game and toy industry is American Microsystems. Their S2200 has an on-chip ROM of up to 2048 bytes, with add-on capability of up to a maximum of 8192 bytes. The program counter (Fig. 1-5) is a pointer to the next instruction to be executed. The program counter stack holds return addresses during the execution of subroutines or interrupts.

The scratch-pad RAM holds the values of up to 128 4-bit data words, typically numeric quantities. The BA, BU, and BL registers are used to access RAM words. The E register can be used as a general-purpose register or as an index-limiting register for controlling RAM access.

The ALU (arithmetic logic unit) performs data operations using the accumulator and the carry register. Software can set, reset, and test flags as temporary indicators. The on-chip oscillator generates all clocking signals and needs only an external RC circuit to set its rate. A crystal may be used to precisely control the oscillator frequency.

The K lines act as bidirectional ports supporting A/D and D/A converters, interrupts, and a programmable counter/timer. The eight bidirectional three-state D lines are general-purpose data signals. The thirteen A lines are outputs for displays, keyboards, control signals, or address lines for external ROM.

SPEECH SYNTHESIS CHIPS

Although games that talk are few in number, the biggest hurdle in making speech synthesis chips, that of creating high-quality

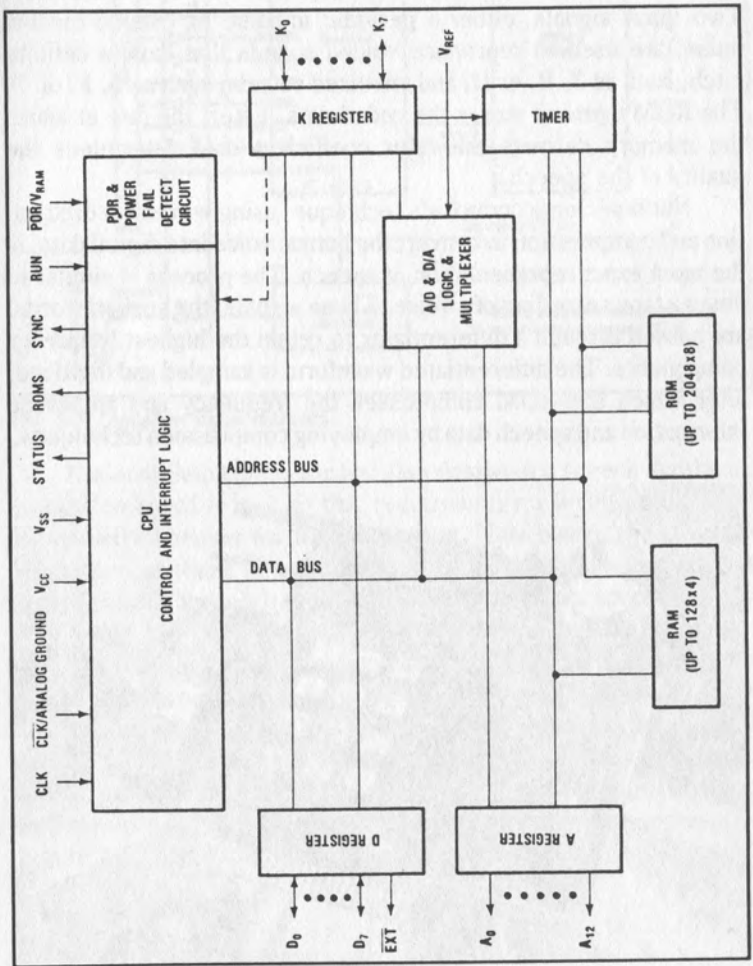


Fig. 1-5. S2200 microcontroller block diagram.

speech while maintaining low memory requirements, has been met and conquered. The result is games that talk to you.

Three different techniques are used by semiconductor manufacturers to synthesize human speech. They are format synthesis (terminal analog synthesis), linear predictive coding, and waveform digitization with compression. The latter two are mostly used in today's computer-controlled games.

Texas Instruments uses the linear predictive coding technique in its Speak & Spell games. This technique is based on a linear equation which formulates a mathematical model of the human vocal tract in order to predict a speech sample based on previous ones. Two input signals, either a periodic impulse or pseudo-random noise, are used to reproduce voiced sounds that have a definite pitch, such as Z, B, or D, and unvoiced sounds, such as S, F, or T. The ROM memory stores the coded data. Later, the rate at which the memory delivers the filter coefficient data determines the quality of the speech.

National Semiconductor's technique, using waveform digitization and compression to convert the human voice into digital data, is the most exact representation of speech. The process is similar to doing a tape recording of a voice. These signals (the spoken words) are passed through a differentiator to retain the highest frequency components. The differentiated waveform is sampled and digitized, after which the ROM compresses the frequency and amplitude information and speech data by employing compression techniques.

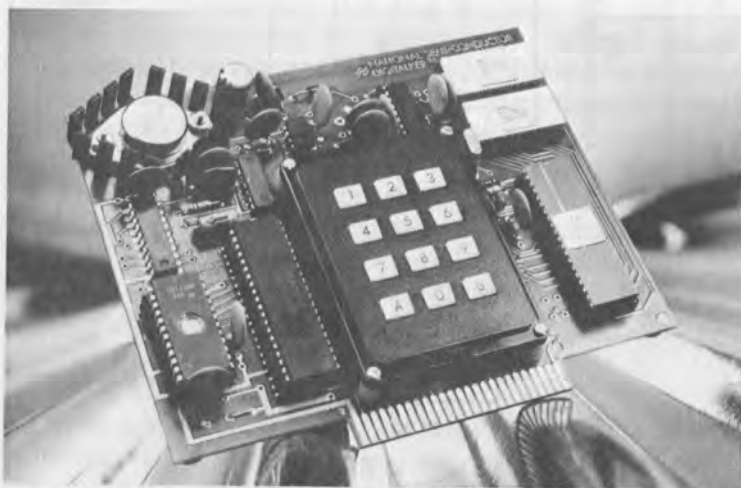


Fig. 1-6. Speech synthesis evaluation board (courtesy National Semiconductor).

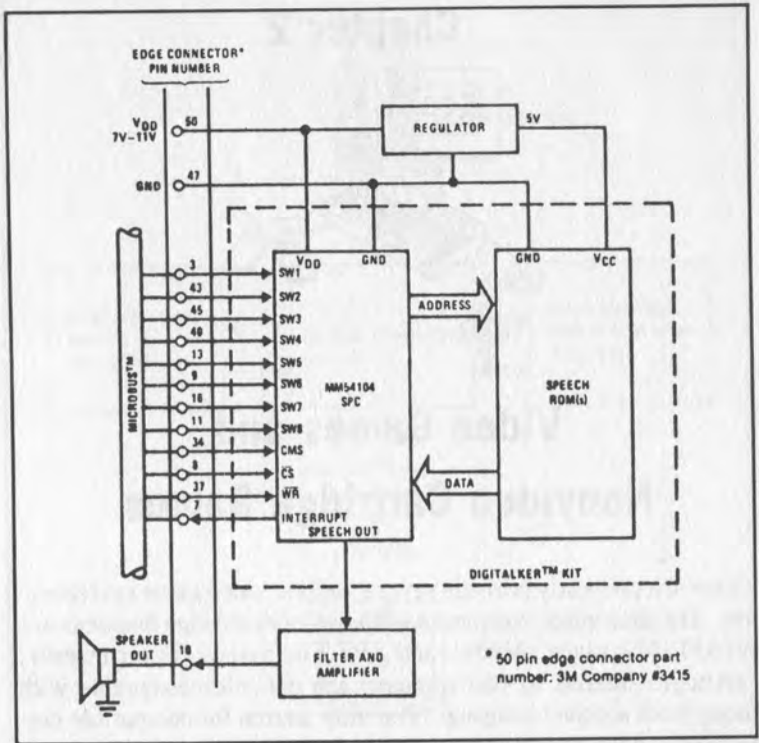
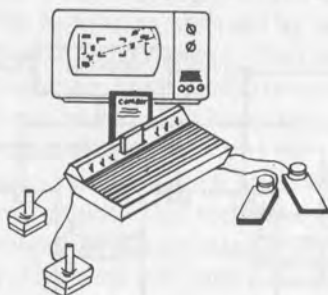


Fig. 1-7. Digitalker block diagram.

National Semiconductor has also designed a speech synthesis evaluation board (Fig. 1-6) that requires only a 9-volt battery and inexpensive speaker for total operation. This board, the DT1000 Digitalker, contains all the components required to output speech upon demand: a speech processor chip (SPC), two speech ROMs containing 138 individual words, output filter, audio amplifier, keyboard, and a COPS microcontroller and EPROM that contains stored data programmed to provide the various functions of the board. The two speech ROMs enable you to link words consisting of numbers and letters of the alphabet, assorted useful nouns, verbs, tones, and silence into phrases and sentences. The Digitalker can be interfaced to any processor system via a 22-pin edge connector. Figure 1-7 shows a block diagram of the Digitalker.

Chapter 2



Video Games and Nonvideo Cartridge Games

There are presently perhaps several million video game systems in use. The four major companies in the video/cartridge business are ATARI, Magnavox, Mattel, and APF Electronics. Unfortunately, cartridges offered by one company are not interchangeable with those from another company. The only source for compatible cartridges is Activision, whose cartridges are designed to be used on the ATARI Video Game.

With each system the supplier provides you with a master component (the CPU or central processing unit), an RF interface to interface the master component with your TV set, and hand controllers to control the images on your TV screen. Figure 2-1 illustrates how the various components interact with each other. You insert cartridges in order to play the different games.

ATARI VIDEO COMPUTER SYSTEM

The ATARI Video Computer System (Fig. 2-2) offers over 1,000 game variations through over 50 cartridges that fit into the master component. The system comes with one plug-in cartridge that provides 27 game variations, including a combat package offering Tank and Jet Fighter, a game that provides steerable and nonsteerable missiles, cloud formations, and many fighter-versus-bomber combinations. The system includes two joystick controls, four detachable paddle controls, and a switch that controls the difficulty of the game.

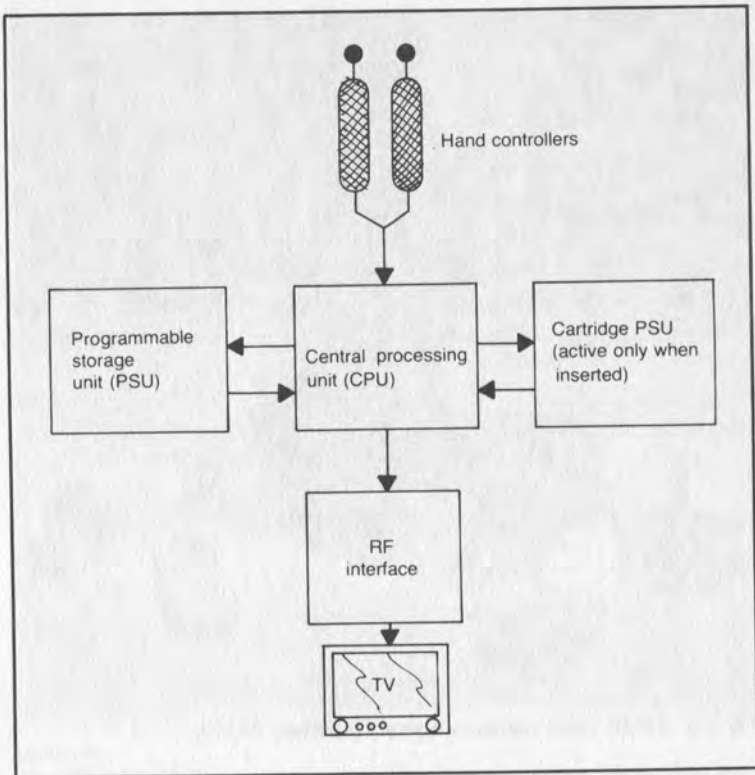


Fig. 2-1. Block diagram of a typical video game system.

The Adventure game is the old-fashioned story of saving the princess from the dragon. The object of the game is to retrieve the royal golden goblet that has been stolen and hidden in the castle. While you travel through the kingdom, you seek all sorts of objects that may help you in your quest. You have to pick up the keys to open the castle doors, a sword, a magic bridge to help you cross the water, and a magnet with which to attract other objects. You can carry only one object at a time, so you have to drop certain objects until you locate the sword. You need this sword, because you have to battle three deadly dragons with it: Yorgle, Rhindle, and Grundle. Of the three, Rhindle is the fastest moving and the most difficult to slay. If you can't get the sword, you can try to outrun Rhindle, but if he catches you, he'll eat you alive. If this happens, don't worry; the computer lets you be reincarnated. There's also a black bat that will do anything to steal whatever object you have just obtained. When you're fast enough and smart enough, you'll find the golden



Fig. 2-2. ATARI Video Computer System (courtesy ATARI).

key that unlocks the castle. Then you must find the goblet and return it to the golden castle.

ATARI's Space Invaders game cartridge offers 112 variations in the battle against space invaders. Thirty-six alien space ships move toward earth, launching missiles as they approach. You have to return fire and prevent them from landing on earth. The invaders increase their attacking speed, their numbers grow, and you have to execute precision firing. Your goal is to eliminate the mother ship in order to win the battle. You have to execute risky tactical decisions. You lose when you have been hit by the enemy three times or when one of the invaders reaches earth.

In the Superman game program, you are "the man of steel." You're in your office at the *Daily Planet*. Suddenly you get a tip that Lex Luthor, your archenemy, is about to blow up the Metropolis Memorial Bridge. You have only seconds to go. You jump into a phone booth, throw on your cape, and you are up and away as you fly high over the city. With your x-ray vision you try to find Lex Luthor's hideout, but the deadly Kryptonites are out to get you, and,

if they do, you have to bring back your super powers by finding Lois Lane.

The Match Wits with Us game program flashes 30 numbers on your TV screen. Hidden behind each is a familiar object or a wild card. Match any two and score.

The Street Racer game program has 27 different game selections. In the Street Racer game, selections 1-6, you're racing down the strip, avoiding other cars as they whip toward you. Slalom, selections 7-12, is a ski game in which you have to avoid the slalom gates. In Dodgem, selections 13-16, you must steer the cars to avoid oncoming objects. Jet Shooter, selections 17-20, lets you be a pilot in a plane, shooting down objects as they come at you from above. Number Cruncher, selections 21-24, involves motorcycles you have to steer over numbers as they flash on the screen. In Scoop Ball, selections 25-27, you must first catch an object coming at you and then relay it to the next object.

The Breakout game program has 48 game selections. You have to smash your way through a multilayered wall of bricks. The first bricks are easy, but the closer you come to breaking out, the tougher it gets. You have to challenge gravity, funny paddles, and invisible bricks.

The Codebreaker game program, with 20 game variations, is a deduction game in which you have to get any cipher in the correct position.

The Night Driver game program takes you for a ride, but you have a rough road ahead. It's winding and dark, and you never know what will jump out on the road at night.

The Flag Capture game program gives you 10 game selections. The computer has hidden a flag in an obscure sector of the map. It's up to you or your opponent to capture it. Strategy is the key. You'll send out explorers to gather clues. Sometimes they unearth arrows, and you'll know how far away or in which direction the flag is buried. Sometimes your explorers dig up bombs and get blown off the map.

The variety of games is endless. The Video Olympics game program offers eight main sports in 50 games, the Surround game program has two games in 14 selections in which you must trap your opponent inside a wall, the Air-Sea Battle game program consists of five games and 27 selections, the Slot Racers game program has three games and 36 selections, the Casino game program offers three gambling games with 4 game selections, the Space War game program lets you play three different space games with 17 selec-

tions and the Outlaw game program features two wild west games with 16 selections. There are also the Video Chess game program, the Skydiver game program, the Canyon Bomber game program, the Human Cannonball game program, the Indy 500 game program, the Combat game program, and the Starship game program. There are also a number of games you are probably already familiar with, such as the Backgammon game program, Bowling game program, Basketball game program, Miniature Golf game program, Golf game program, and Slot Machine game program.

ATARI 5200 GAME CONSOLE

The new ATARI 5200 game console is a 13×13×4 black and silver unit with a top-mounted, hinged smoked-plastic lid. Each unit comes with two controllers that plug into any of four 15-pin jacks at the front of the console.

Each controller combines the operation of joystick, paddle, and keyboard into a single handheld unit that fits comfortably in a child's palm (Fig. 2-3). The control stick moves game figures in any direction instead of just the usual eight directions. It can also be used to control the game character's speed. A pause button lets the player put the game on "hold" at any time.

The Model 5200 features a built-in storage area for the controllers under the hinged lid, and for maximum convenience, a new switchbox that automatically switches from television programs to game play.

16K of random-access memory provides excellent graphics and fast game action. Depending upon the game played, four red buttons on the side of the controller allow selective firing, and three additional buttons on the top are for starting, pausing, or resetting the game. At the bottom part of the controller are a dozen buttons that allow the user to select the number of players, and different levels of difficulty, as well as other specialized functions for certain games.

ATARI has updated and enhanced their Video Computer System games for use on the 5200 game console including such favorites as Super Breakout, Space Invaders (a trademark of Taito America Corp.), Missile Command, and Star Raiders.

Also available will be sports games, such as Baseball, Football, Soccer. In the Baseball game (Fig. 2-4), for example, pitchers can throw fast balls, slow balls, inside or outside. They can also slip a knuckle ball in. There is a relief pitcher warming up in the bullpen, ready to replace a bad starter. Batters not only hit the ball, they

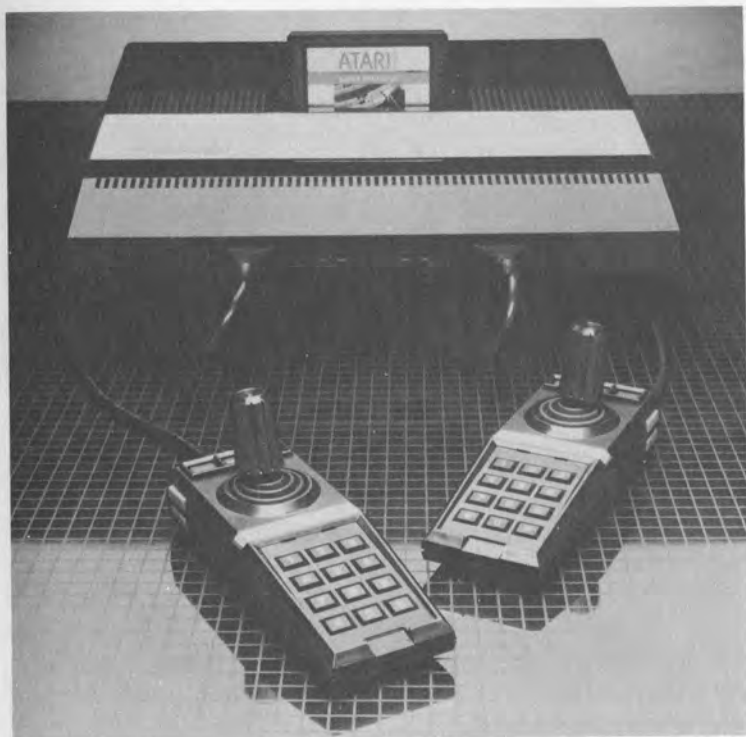


Fig. 2-3. The ATARI 5200 game console (courtesy of ATARI).

deliver pop flies, line drives, and grounders. Base runners can slide, steal, and even tag up on high fly balls. Craftcoaches can maneuver their teams into different defensive positions. Fielders can run all the way to the fence to make leaping catches of bleacher-bound balls. Crowds will cheer and the crack of the bat against the ball can be heard.

For 1983 ATARI has planned two new features: a Trak-Ball controller, which will give players the precise 360-degree control of the best arcade video games, and a voice synthesizer module, which will become an integral part of game play, not just a sound generator. Voices from the synthesizer will interact with the player for the ultimate in video game realism.

Atari will also have ready in 1983 an adapter that will allow all ATARI Video Computer System game cartridges to be played on the 5200. With this 5200, which is essentially a stripped down 16K model 400/800 ATARI computer, and the new games, ATARI has set an example that others can only follow.



Fig. 2-4. Baseball on the ATARI 5200 game console.

I have seen the unit in action utilizing the games Space Invaders and Galaxian. The Space Invaders has 12 levels of difficulty, while Galaxian can generate 32 attack waves to challenge even the most experienced player.

ACTIVISION

Activision, an independent corporation, manufactures game cartridges for use in ATARI's Video Computer System and Sears' Tele-Game Video Arcade programmable video games. These games all require joysticks.

Fishing Derby (Figs. 2-5 and 2-6) is a game in which you have to catch as many fish as possible without losing them to the shark—and that shark is a quick one. Once you've hooked your fish, you play it back and forth until the shark moves out of the way. Then, you press the red button and land your fish quickly. You can play this game against the computer or against another player. There are six rows of fish: the first two rows count for 2 pounds each, the second two rows 4 pounds each, and the bottom two rows 6 pounds each. Ah yes, the big ones are down deep. The first player to land 99 pounds of fish wins.

When you play Laser Blast (Fig. 2-7), get set for the battle of your life against enemy attackers from outer space. There are four game levels: cadet, lieutenant, captain, and commander. The dif-

ference between the games is how rapidly the speed and firing rate of the enemy ground attackers improves as the game progresses. The relative difficulty of an attack group is calculated by multiplying the speed times the firing rate for that group. The following chart shows how the difficulty of each attack group changes during play of each game. For example, at the captain and commander levels, the most difficult attack groups are 32 times as difficult as the easiest.

Games	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Cadet level	1	2	4	8	8	8
Lieutenant level	1	2	4	8	16	16
Captain level	1	2	4	8	16	32
Commander level	1	32	32	32	32	32

The game's joystick is used to pilot your spacecraft, and you can pilot only one ship at a time. The red button on the joystick

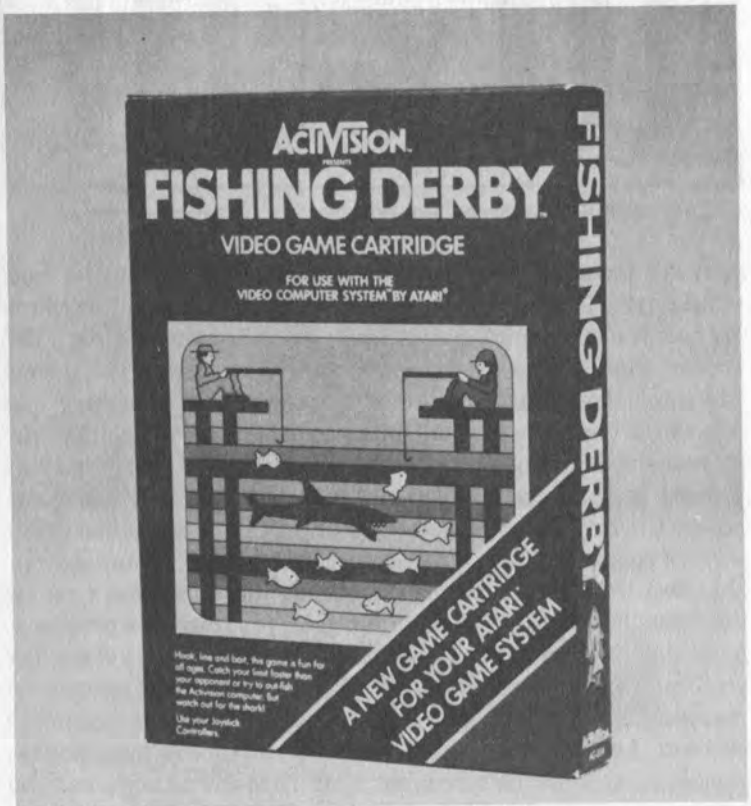


Fig. 2-5. Fishing Derby game cartridge (courtesy Activision).

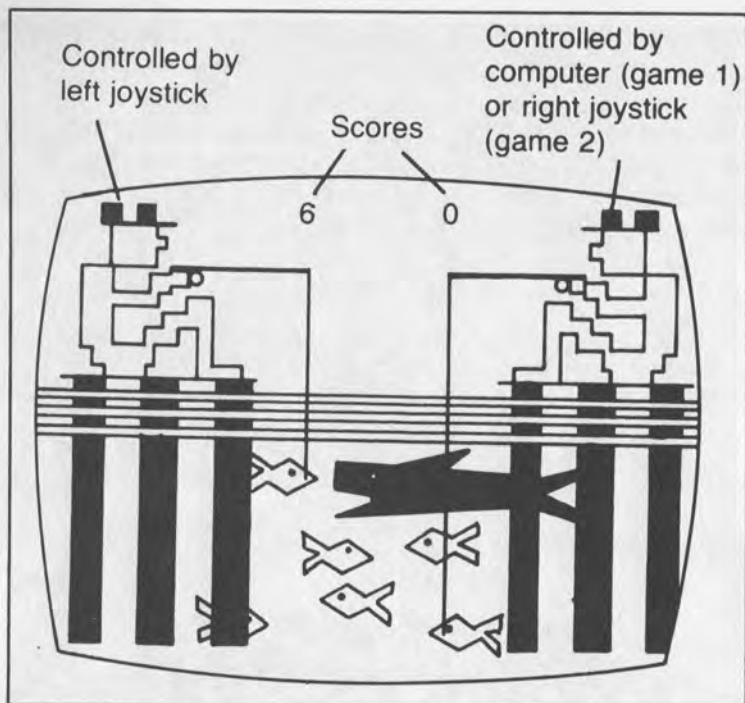


Fig. 2-6. Fishing Derby screen display.

activates the ship's laser blaster. You are awarded points for each attacker you destroy. As you progress through the game, attackers are worth more points, but they're also tougher to destroy. The ground attack forces are equipped with radar detection systems which help them aim their lasers at your ships. Don't allow your ship to hover in one place too long, because the enemy will quickly line up your ship in its sights and destroy you. Fly low to the ground (as is done in real attack situations) to keep your craft under the enemy's radar. The game gets tougher as it progresses. Each new wave of enemy attackers obtains a stronger force field, forcing your ship away from the ground and diminishing your chances of avoiding the radar. For each 1,000 points you gain, you're given a reinforcement ship. You can receive an unlimited number of such ships, but you can have only six ships on the screen at one time. This is by no means an easy game. It takes quick reflexes and concentration to succeed. Activision asks that if you score 100,000 or more points, send in a picture of the screen and your name and address, and you will become a member of the Activision Federation of Laser Blas-

ters. A score of 1 million points will place you as one of the all time best video game competitors.

For skiing enthusiasts, Skiing (Fig. 2-8) features a variety of slalom and downhill ski runs (Fig. 2-9) at varying levels to test everyone, from beginners to experienced skiers. You control an on-screen skier by using the joystick. In the slalom run mode, there are five games: 20 gates, novice run; 40 gates, intermediate run; 30 gates, expert run; 50 gates, olympic run; and 30 gates, a new expert run. The downhill run also has five modes: 200 meters, novice hill; 300 meters, intermediate hill; 500 meters, expert hill; 900 meters, olympic hill; and a new 900-meter olympic hill. The object of the slalom run is to run through all gates (between the poles) in the fastest time. In downhill racing, you have to reach the bottom of the hill in the fastest time.

For boxing fans, the Boxing game (Fig. 2-10) offers the opportunity to fight against the computer or against another player. You can set the game for professional or amateur class competition. Opponents can jab, dance, push each other to the ropes, and score points by punching. Each punch is scored for its power and effect. The object of the game is to out score your opponent or score a K.O. by accumulating 100 points before the end of each 2-minute round.

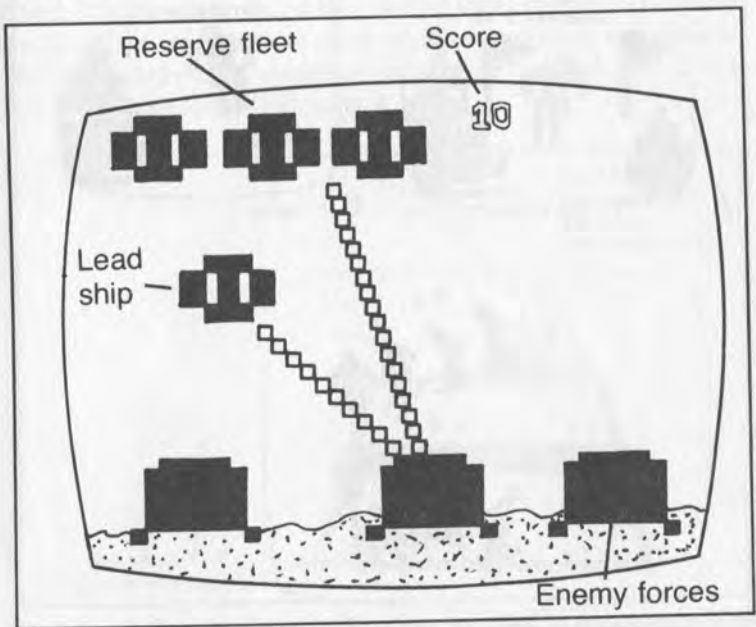


Fig. 2-7. Laser Blast screen display.



Fig. 2-8. Skiing game cartridge (courtesy Activision).

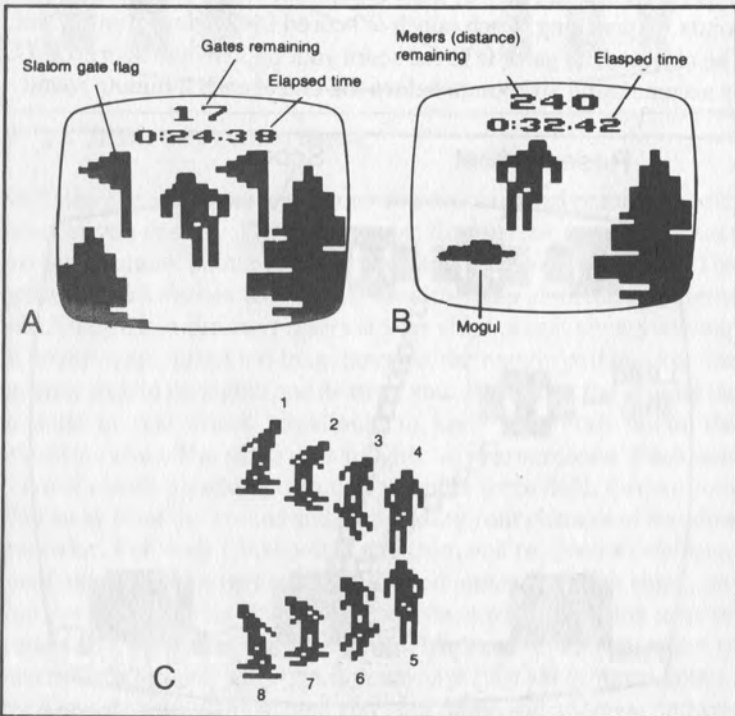


Fig. 2-9. TV screen of Skiing: (A) slalom; (B) downhill racing; (C) the eight ski positions.

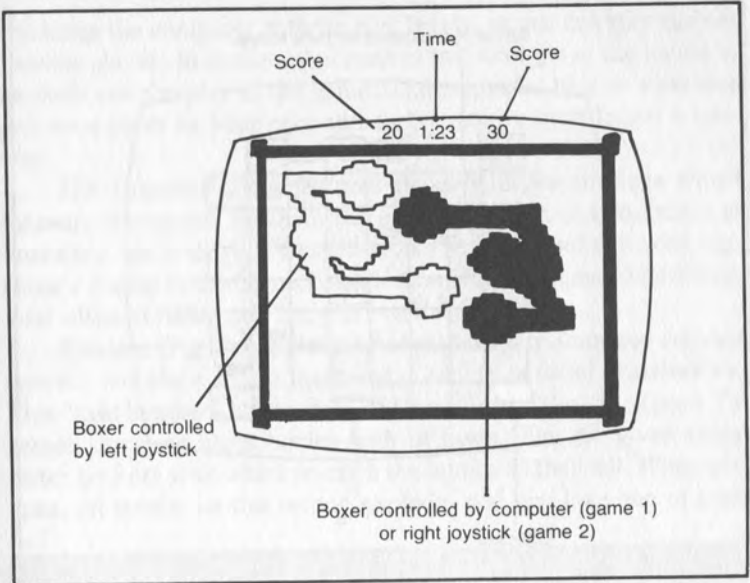


Fig. 2-10. TV screen of Boxing.

Tennis (Fig. 2-11) is a realistic video representation of this game. Players can serve, hit from the baseline, rush the net, and hit anything from drop shots to cross-court passing shots for winners. The graphics provide a unique perspective on the court, including a ball that has a shadow following it.

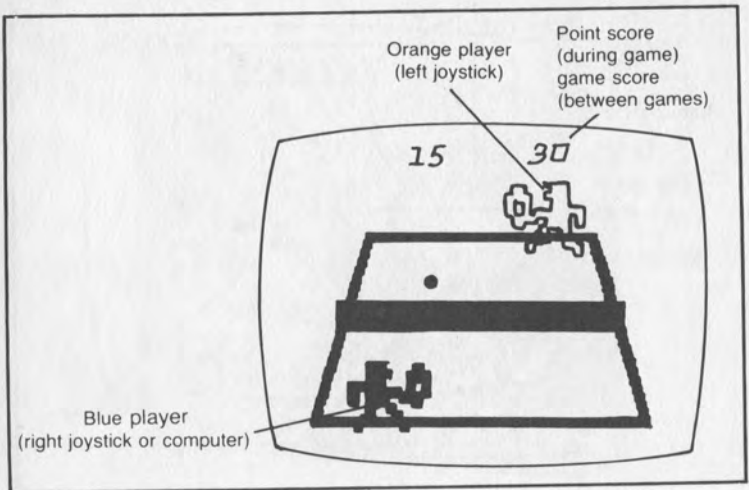


Fig. 2-11. TV screen of Tennis.

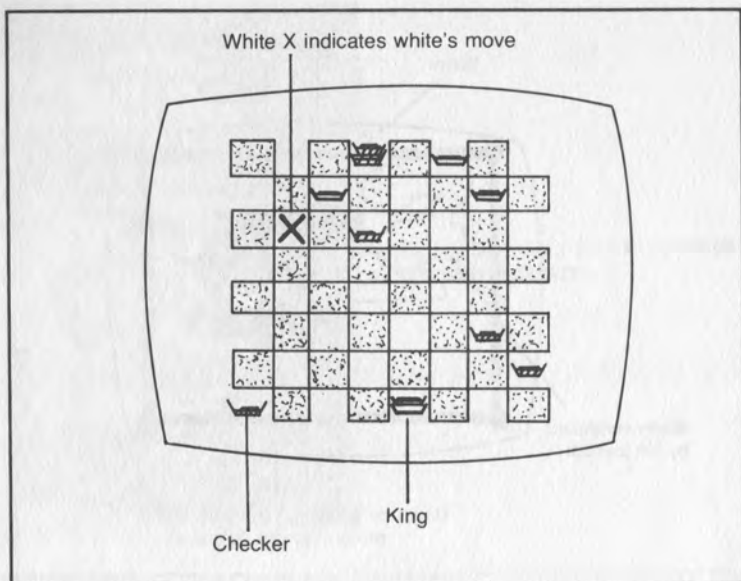


Fig. 2-12. TV screen of Checkers.

Checkers (Fig. 2-12) and Bridge (Fig. 2-13) represent game playing as it is done with real checkers or cards. Checkers features all the moves, jumps, and kings of the traditional game. You can

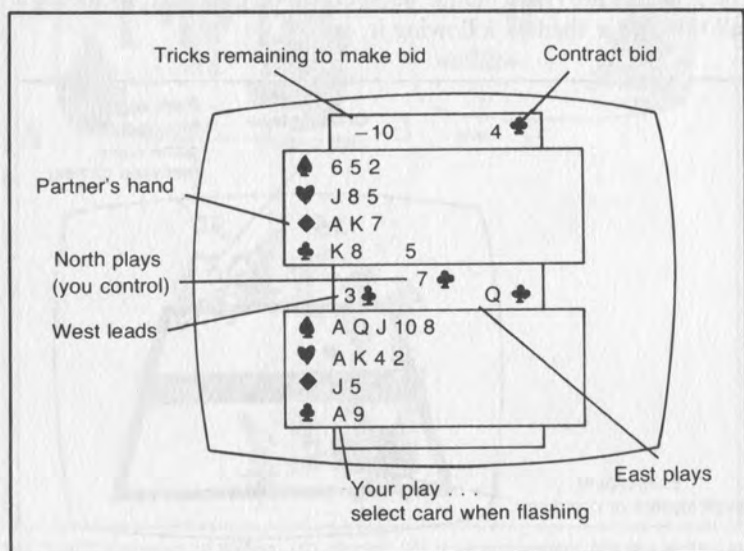


Fig. 2-13. TV image of Bridge.

challenge the computer at three play levels, or you can play against another player. In Bridge, you control the strength of the hands to be dealt and the play of the game. The computer bids as a partner and even plays as your opponents after you've established a contract.

The Dragster game features tachometerlike displays which measure the speed at which the engine on each of two racers is operating. As a driver, you must clutch, shift, and rev your machine's engine at the correct tach readings in each gear to minimize your elapsed time from the start to the finish line.

Kaboom (Fig. 2-14) features a meticulously animated cartoon convict, complete with a mask and a variety of facial expressions. This "mad bomber" roams back and forth across the top of your TV screen dropping black bombs with lit fuses. You are given three water buckets with which to catch the bombs as they fall. When you miss, all bombs on the screen explode, and you lose one of your



Fig. 2-14. Kaboom game cartridge (courtesy Activision).

buckets. You have to be very fast. The more bombs you catch, the faster the mad bomber drops them. Within a minute after the start of the game, he's dropping bombs at the rate of 13 per second.

MATTEL INTELLIVISION

The Intellivision computer game system consists of a master component with two nondetachable hand controllers and an antenna switch box. Each game cartridge comes with customized printed overlays that fit directly over the hand controller keys (Figs. 2-15 and 2-16).

Installing the system is extremely simple and requires only a flathead screwdriver. First, you disconnect the VHF twin lead antenna wire (if there is one) from your TV set and connect it to the antenna switch box. Then connect the twin lead wire from the switch box to the VHF screw terminals of your TV set (Figs. 2-17 and 2-18).

Setting up your system for game playing is equally simple. Connect the switch box to the master component using the 15-foot cable provided and turn the switch at the bottom of the master component to either channel 3 or 4. (The channel you use depends on reception in your local area.) When channel 3 is not used for regular TV or where it has weaker reception, flip the switch to channel 3. If channel 4 is not being used, flip the switch to channel 4.

Plug the master component power cable into a 120-volt wall outlet, set the antenna switch box to GAME, and turn on your TV



Fig. 2-15. Intellivision intelligent TV system (courtesy Mattel Electronics).

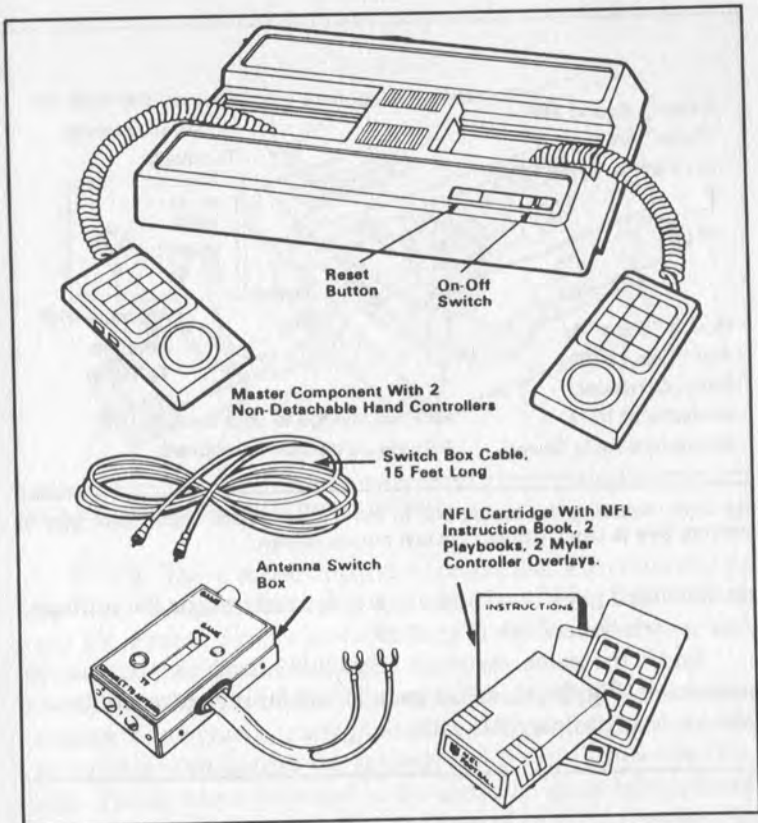


Fig. 2-16. Components of the Intellivision video game system.

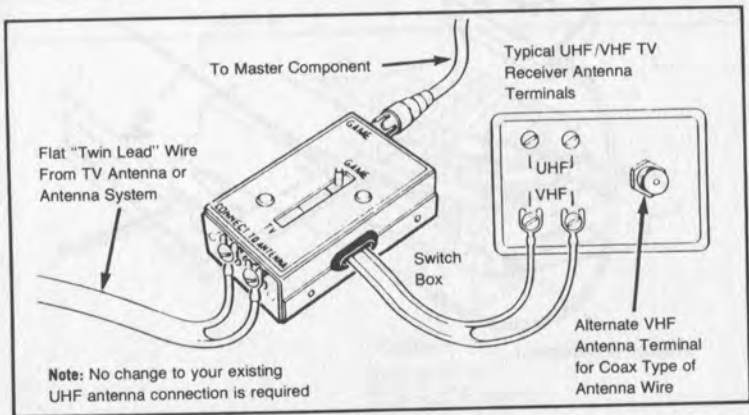


Fig. 2-17. Installing the switch box to the TV set where flat twin lead type of antenna wire is used. Connect switch box as shown.

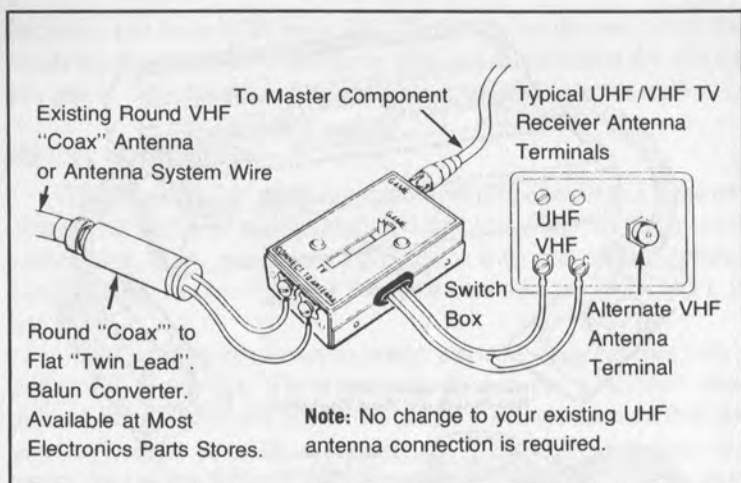


Fig. 2-18. Installing the switch box to the TV set where round coax type of antenna wire is used. Connect switch box as shown.

set and turn it to either channel 3 or 4, depending upon the setting of your switch box switch (Fig. 2-19).

Insert the game cartridge (Fig. 2-20), turn on your master component (Fig. 2-21), adjust your TV set for proper reception and you are ready to play the game.

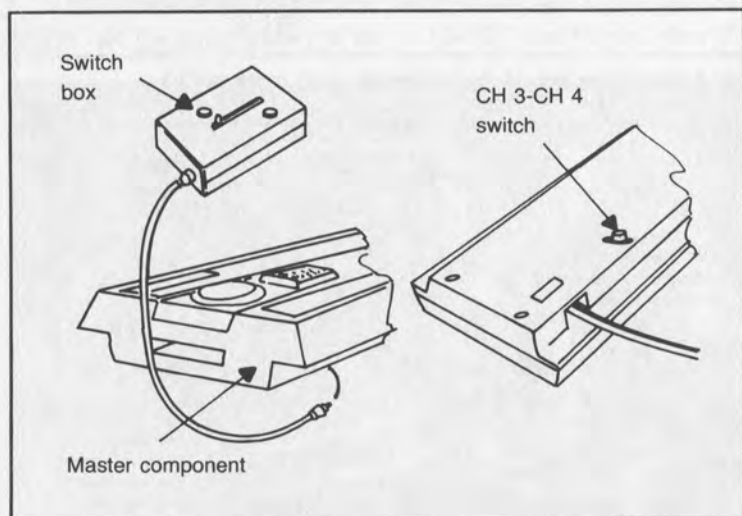


Fig. 2-19. Connecting switch box to master component and switch setting on channel 3 or 4.

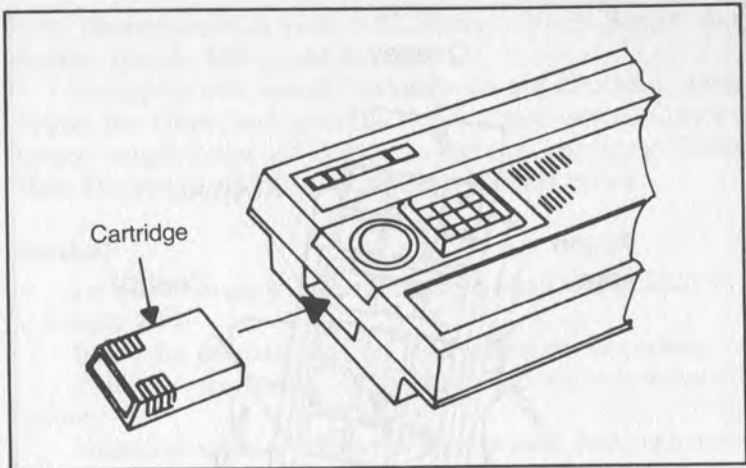


Fig. 2-20. Simple insertion of game cartridge.

NOTE: There is one important feature that will eliminate the possibility of a permanent playing field image being imprinted on your TV screen. Simply press buttons 1 and 9 at the same time (located on your hand controller).

The two hand controllers, permanently attached to the master component, are crucial to any game play. Each cartridge comes with two overlays that fit over the keypads and are easily inserted (Fig. 2-22). The overlays are keyed to the particular game being played. They determine how the keys on the keypad relate to the cartridge and are used for feeding data into the computer.

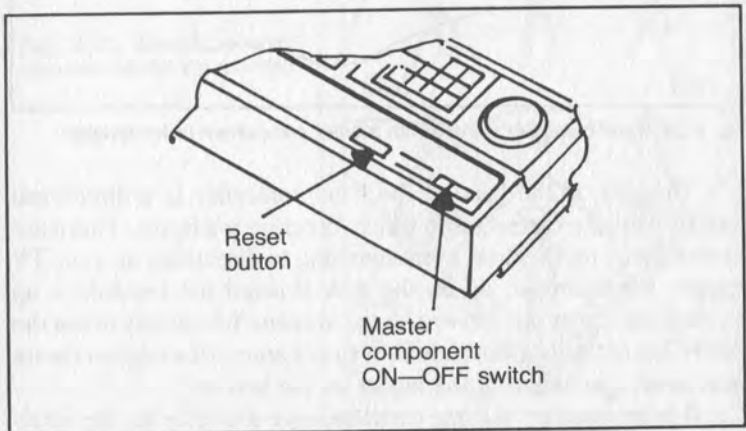


Fig. 2-21. Controls of master component.

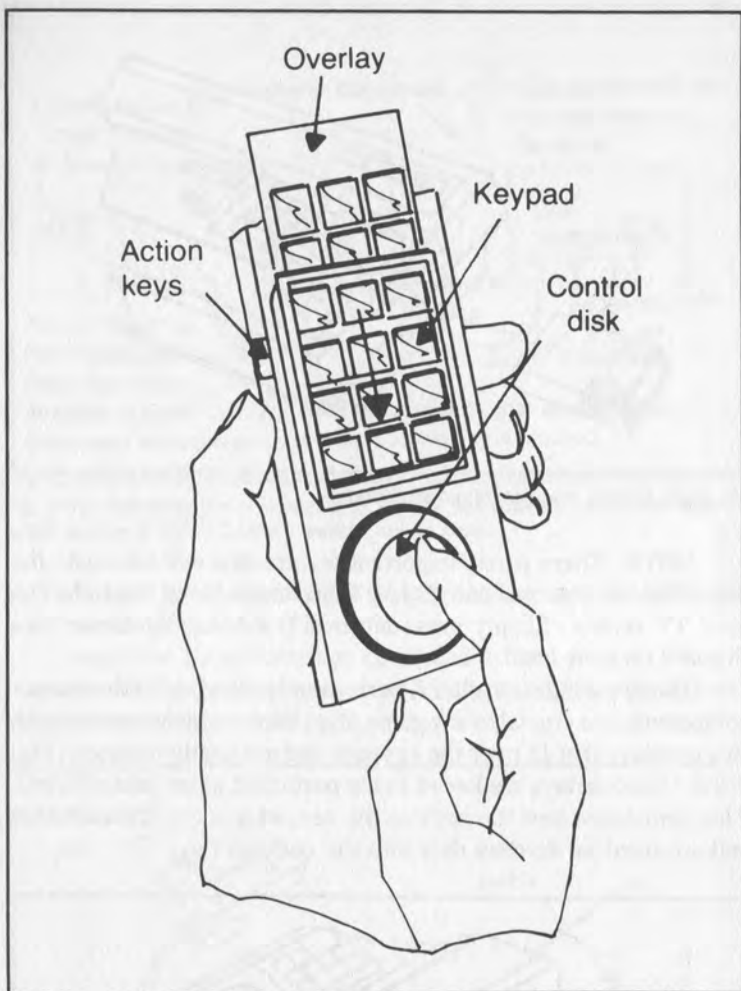


Fig. 2-22. Hand controller for use with master component of Intellivision.

The disk at the base of the hand controller is a directional control for those cartridges in which direction is a factor. There are 16 directions on the disk, corresponding to directions on your TV screen. For example, up on the disk (toward the keypad) is up (toward the top of the screen) on the screen. You simply press the outer edge of the disk and slide your finger around the edge to create directional movement of the object on the screen.

A large number of game cartridges are available for the Intellivision. In sports there are Major League Baseball, NFL Football,

NBA Basketball, PGA Golf, NHL Hockey, NASL Soccer, Auto Racing, Tennis, Skiing, and Boxing.

Strategy games include Backgammon and Checkers. Armor Battle, Sea Battle, and Space Battle are action games. Games of chance include Poker and Blackjack, Roulette, and Horse Racing. Math Fun and Word Fun are children's learning games.

Baseball

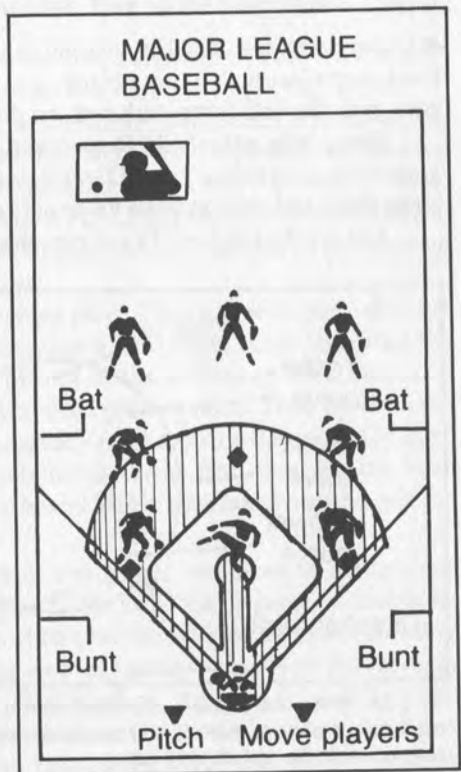
Let's use one game, Major League Baseball, and look at how it is played.

Insert the Baseball cartridge into the master component.

Press the reset button; the title, Baseball, appears on your TV screen.

Select the speed at which you wish to play. Pushing button 1 allows you to play at medium fast—triple A, button 2 is medium fast—college, and button 3 is the slowest speed rated as spring training. Insert the overlays (Fig. 2-23) into the hand controllers.

Fig. 2-23. Baseball overlay (courtesy Mattel Electronics).



Notice a few important items before you begin playing.

- To throw a ball to any defensive player, you have to push down on the fielder who will receive the ball.
- You have two pitch controls (the side buttons on your hand controller). One is for batting; the other is for bunting.
- You can do three things with the direction disk: pitch, move runners forward or back on the bases, and move fielders to send them after the ball.
- The scoreboard is on top of your TV screen.
- The home team is blue, and the visitors are red. Visitors always bat first.
- The scoreboard keeps track of strikes, balls, outs, innings, and runs.
- Men in the play change color to identify them faster.

The home team takes the field wearing medium blue; the man from that team you select to control turns black. A home team man who gets the ball turns light blue, as does the lead runner of that team.

● In the same fashion, the visiting team wears medium red, and their control man also turns black. The player of the visiting team who gets the ball turns dark red, as does their lead runner.

Now, let's play ball. Remember, all hits in this game are grounders, so a batter cannot fly out, not even on fouls. You can hit home runs, and you can make force-outs and double and triple plays.

You are the pitcher! To activate the pitch you have to press the

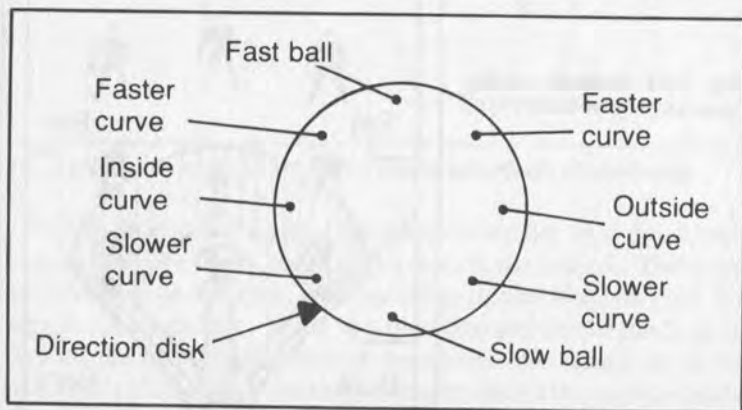


Fig. 2-24. Where the disk is pushed determines the kind of pitch. It also determines how a curve is thrown. You can throw fast and slow, inside and outside curves, fast balls, and change-ups.

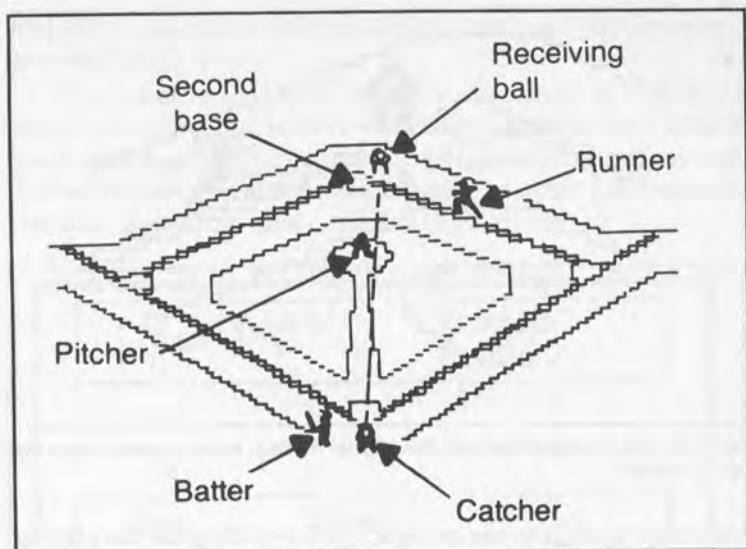


Fig. 2-25. Catch a fielder in a rundown. Fake out the base runner.

outer edge of the direction disk. Press anywhere. Throw a fast ball. A curve. Any curve. Memorize the disk controls (Fig. 2-24).

You're throwing a fast inside curve. No contact is made by the batter. Return the ball from the catcher to the pitcher by pressing the PITCHER on the hand controller. When there's a man on base, keep him close. Push down on a FIELDER button to indicate which fielder is to receive the ball, first or second base, etc. The baseman automatically covers his base.

Of course, try for a pitchout play. When a base runner takes too big a lead, have your pitcher throw an outside curve, ignoring the batter. Now, the catcher throws to the second or third baseman, ahead of the base runner. You need quick actions. Push down on the right side of the disk, then, quickly push down on the second or third base position. Get your catcher to throw fast, trapping the base runner. Catch him in a rundown. Move your basemen and get the put-out.

In the defensive part of the game, you have to move your fielders. Watch the direction of the ball. Get a jump on that ball. Start your fielder moving when you see where the ball is heading (Fig. 2-25 and 2-26). It's an exciting game—exactly as it is done in the majors, with tag outs, double plays, and all.

You are the batter! Watch the pitch and swing when you think the ball is in a good position. Bat or bunt. Time your swing, because

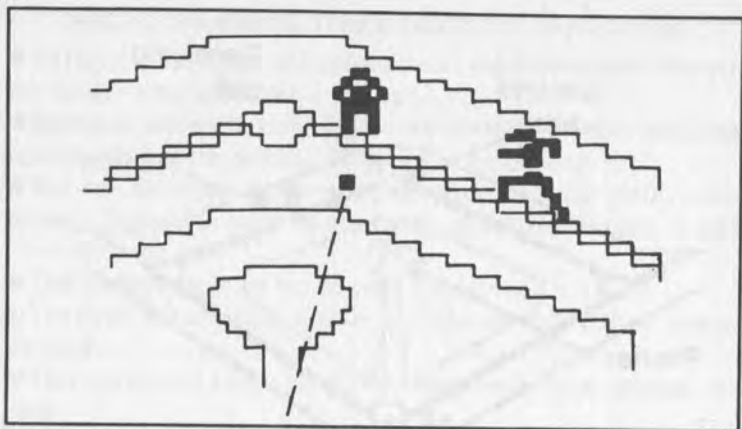


Fig. 2-26. Get a jump on the ball. Start fielder moving, when you see where the ball is headed.

you can get a strike if you swing at a ball over the plate too early or too late or too wildly at a curve. If you don't hit, it's also called a strike. Of course, place the ball. And when you've hit it, run! If you overrun the base, you'll have to get the runner back on base by manipulating the direction disk. You can draw walks, lead off, steal bases, and perform other major league actions. As in the big leagues, if the score is still tied after nine innings, you go into extra innings.

Blackjack

I played the Intellivision Blackjack and Poker games. I lost a few. I won a few. The computer does not necessarily always win. The same overlays (Fig. 2-27) are used for both games.

Before playing either game, you will have to take notice of a few general instructions.

- In all games when the word DEALER appears on the screen, the letters P1 and P2 (player 1 and player 2) will also appear.
- A flashing arrow appears next to whichever player has the next turn.
- At the end of each hand, the letter W appears beside the player who wins, and the letter L next to the one who lost.
- When playing Blackjack, a PUSH is a tie.
- WALLET means your pretend bank. When you lose your entire WALLET, you're out of the game, and your hand controller becomes inoperative. In case you and the computer both lose the

WALLETS, the dealer will say BANKRUPT, and you can start a new WALLET.

The object of the game, of course is to score as high as 21 points—or close to that number—while beating the dealer’s hand. If you’re dealt over 21 points, you lose. All numbered cards 2 through 10 count for their face value. An ace counts for either 1 or 11 points. The king, queen, and jack count for 10 points.

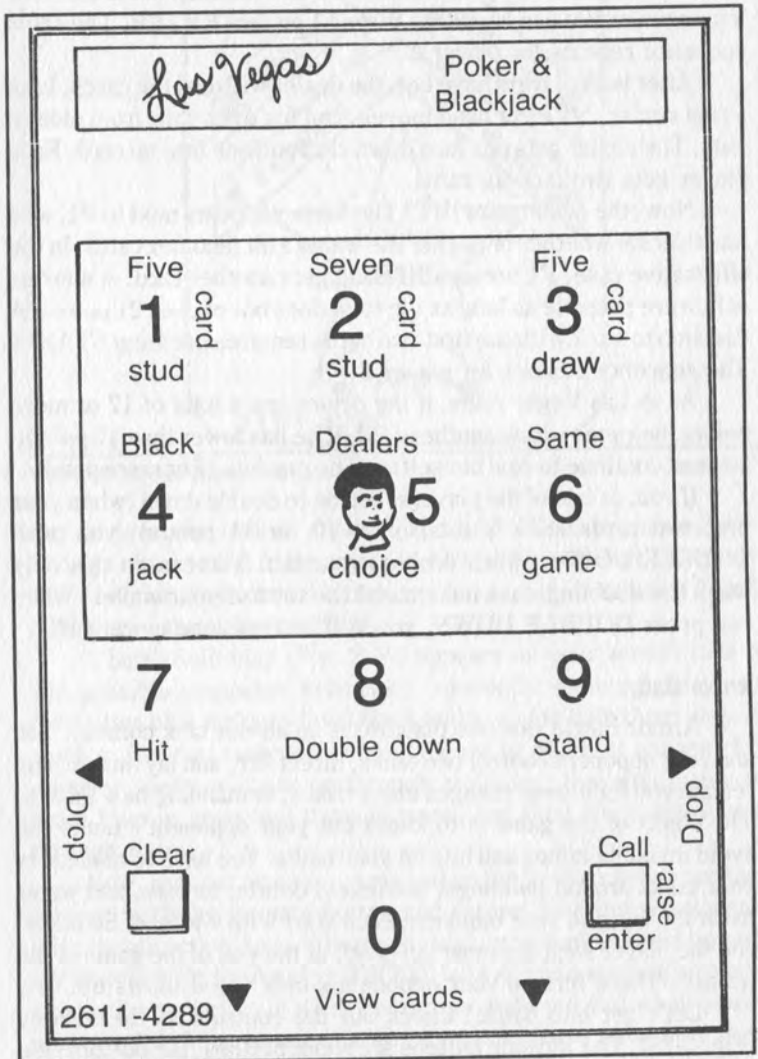


Fig. 2-27. Poker and Blackjack overlay.

Insert the cartridge and overlay, and press RESET. The DEALER appears on the screen asking WALLET? Both players enter the amount of money they want to play with. Then, push ENTER. Dealer asks READY? Press BLACKJACK. Dealer will confirm with BLACKJACK and automatically shuffle a full deck.

The dealer now ask BET? The flashing arrow appears next to P1, who makes the first simulated bet. (Remember, you cannot bet more than the value of your wallet, and the minimum bet is \$1. Your maximum wallet can be \$999.) Player 1 pushes ENTER. The same sequence repeats for player 2.

After both players have bet, the dealer will deal the cards. Like a real dealer, his right hand moves, and his eyes shift from side to side. The dealer gets one face down card and one face up card. Each player gets two face up cards.

Now, the dealer asks HIT? The flasher appears next to P1, who must decide whether or not he/she wants a hit (another card). In the affirmative case, P1 presses HIT and gets another card. A number of hits are possible as long as the total does not exceed 21 points. A decision to stick with the first two cards requires pressing STAND. The sequence repeats for player 2.

As in Las Vegas rules, if the dealer has a total of 17 or more points, he cannot draw another card. If he has fewer than 17 points, he must continue to deal himself until he reaches 17 or more points.

If you, as one of the players, decide to double down (when your first two cards show a total of 9, 10, or 11 points), you push DOUBLE DOWN, which doubles your bet. You can do this only when the doubling does not exceed the total of your wallet. When you press DOUBLE DOWN, you will be dealt one more card.

Armor Battle

Armor Battle (for two players) is an all-out tank combat. You and your opponent control two tanks, direct fire, and lay mines. The terrain you fight over changes many times, demanding new tactics. The object of the game is to knock out your opponent's tanks and avoid invisible mines and hits on your tanks. You have to maneuver your tanks around buildings, battlefield debris, forests, and water hazards. You and your opponent each start with a total of 50 tanks, and the player with the most tanks left at the end of the game is the winner. Three hits on your opponent's tank and it blows up.

Let's get into battle! Check out the controls on the overlay (Fig. 2-28). The top side buttons are shoot buttons, the bottom side buttons move the tank forward, SWITCH TANKS switches the

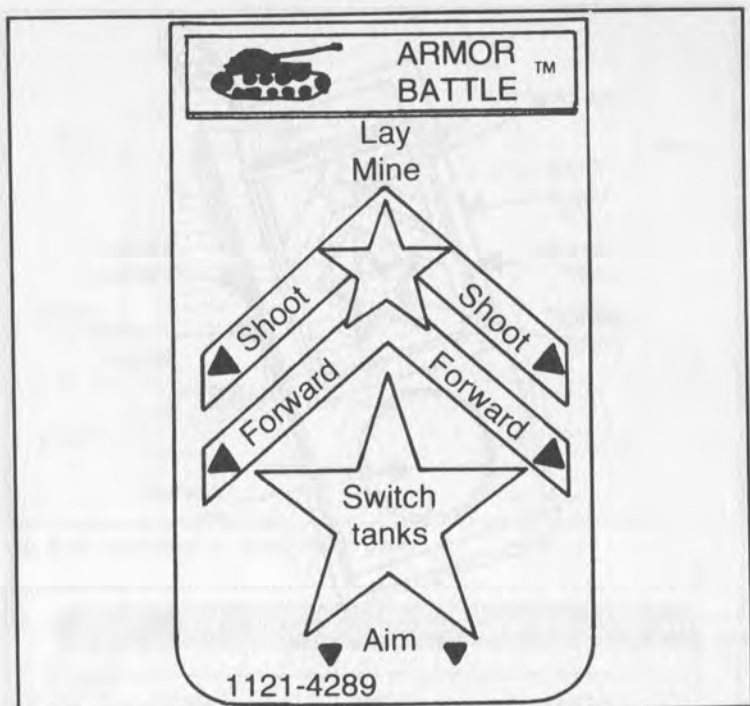


Fig. 2-28. Armor Battle overlay.

control from one tank to another, and LAY MINE is pressed once during a tank combat to lay a mine, which will go off after 5 seconds. The direction disk turns the tank so you can aim its cannon. Figure 2-29 shows the game controls.

A battlefield map (Fig. 2-30) appears on your screen (one of 240 possible computer selections, randomly selected). You will notice two blue tanks and two black tanks, and to help them identify quickly, the two tanks on both sides are in different shapes. Remember, tanks will not go through buildings; they run faster on roads than in grass and through trees, and they run much slower through water.

Now, pick out an enemy tank and go for it. Maneuver your tank forward with the forward button and control its other movements with the direction disk. When you think your tank is lined up with the enemy tank, push either SHOOT button, and a moving black dot shows the path of your shell. Sound and sight tell you when you've scored a hit, but you need three hits to eliminate an enemy tank. Your enemy can also lay mines. Your tank changes position every

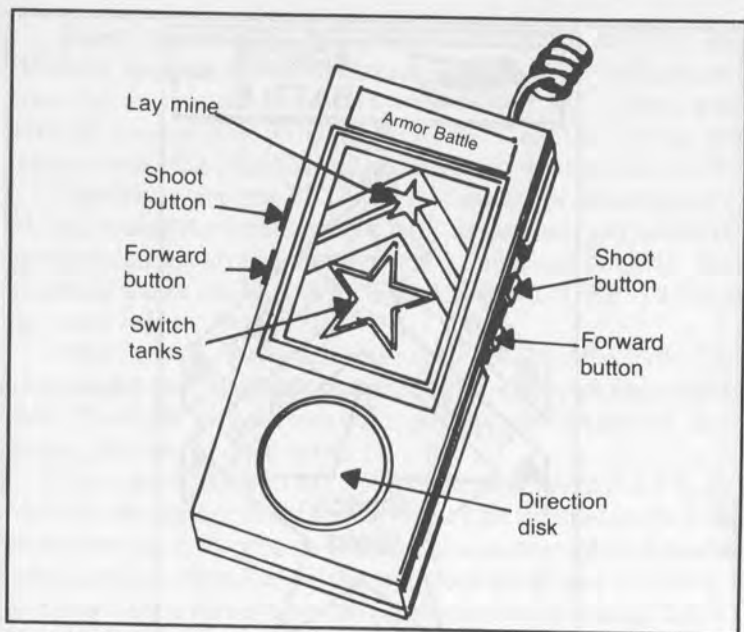


Fig. 2-29. Game controls for Armor Battle game.

time you shoot because of the recoil. Hits on the enemy's tank will also cause it to change position. Watch out for range! When you are too far away from your opponent, the shell will not reach.

The battle requires real strategy. You have to watch your opponent, look out for obstacles, practice your aim, get the jump, use cover, lay mines, catch the other tank in a water trap, and fight both enemy tanks at once. The game is exciting and absorbing, requiring fast reflexes and extreme concentration.

Math Fun

The object of Math Fun is to correctly answer as many problems as possible in the shortest possible time. The game can be played by one player, or two players can compete against each other in an exciting contest.

Figure 2-31 shows the overlay. The number keys are used to give your answers to the problems, select the number of problems you want to try, and choose the level of difficulty. The enter key must be pressed after choosing the number of problems, after choosing your level of difficulty, after giving your answer, after a wrong answer and if you want to continue playing. The erase key

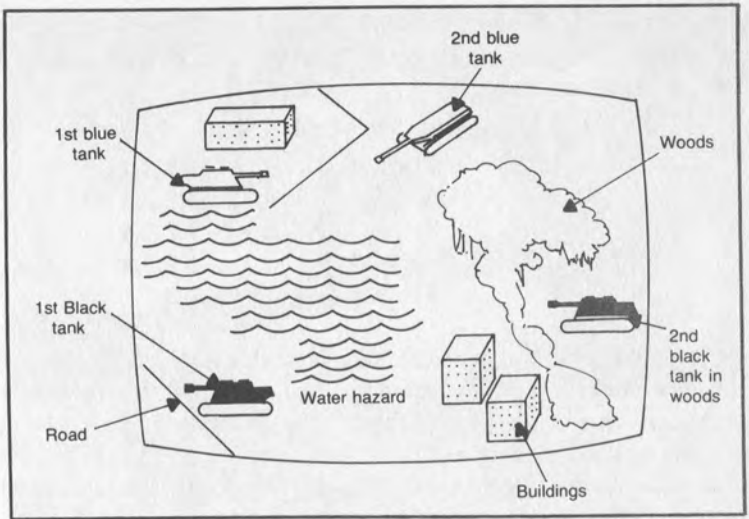


Fig. 2-30. Battlefield for Armor Battle game.

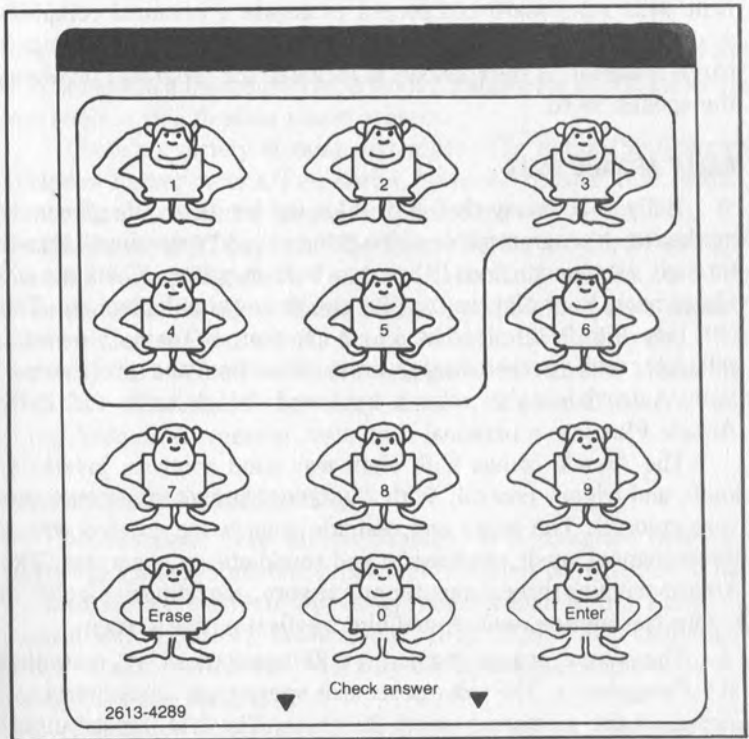


Fig. 2-31. Math Fun game overlay.

can be used to change your answer before you have pressed the enter key. There are 18 levels of difficulty, divided into color and skill levels as follows:

Difficulty (blue)	Color level (red)	Skill level (green)
	Black key	1,2,3,4
	Blue key	1,2,3,4
	Yellow key	1,2,3,4
	Purple key	1,2,3,4
	Red key	1,2

Math fun is a highly imaginative game that is aimed at children. Imagine you're a gorilla walking through the jungle. Behind every tree lurks an animated animal, and behind every animal, a problem in addition, subtraction, multiplication, or division. You can escape the animal by solving the math problem. If you miss, you'll have to jump in the river where you'll encounter ferocious crocodiles.

NOTE: Mattel Electronics has expanded its master component with a keyboard component to create a personal computer system. A cassette device accepts a wide range of specially prepared material. A microphone is included for programs involving the spoken word.

BALLY ARCADE PLUS

Bally, a company that is well known for its arcade games, is marketing a programmable video game called Professional Arcade through Astrovision Inc. It has two built-in games, Gunfight and Checkmate. Four players can play the games simultaneously. The unit (see Fig. 2-32) also has a four-function, 10-memory printing calculator with a screen display, entry correction, and scroll button. Bally/Astrovision also offer a keyboard, which turns the Bally Arcade Plus into a personal computer.

The Arcade comes with eight-way hand controls, joysticks, knob, and trigger control. With 256 color choices, the games are very colorful. The tunes and realistic sounds are created with a three-channel music synthesizer and sound effects generator. The Arcade contains three computer processors, operating in parallel to create fast motion, sound, and high realism on the screen.

The central processing unit is a Z80 computer chip, operating at 1.8 megahertz. The video processor operates at 7 megahertz and increases the animation speed 20 times. The I/O (input/output) processor handles the joystick and keypad inputs and creates the



Fig. 2-32. Bally Arcade Plus with programming keyboard (courtesy Astrovision Inc.).

sound effects. Three separate sound synthesizers with both AM and FM noise and a frequency range from 2 megahertz to 100 kilohertz are used in this flexible sound system.

There's a variety of game cartridges. The Action/Skill Series includes Panzer Attack/Red Baron, Seawolf/Missile, Star Battle, Astro Battle, Galactic Invasion, Space Fortress, Grand Prix, Pirate's Chase, and Dogpatch. The Sports Series provides Baseball/Tennis/Hockey/Handball, Football, Basketball, and Soccer. The Education Series offers Bingo Math/Speed Math, Letter Match/Spell 'n Score/Crosswords, Music Maker, and BioRhythm. The Strategy Series lets you choose such games as Amazin' Maze/Tic-Tac-Toe, Blackjack/Poker/Acey Ducey, Roman Checkers, and King Arthur's Adventure.

MILTON BRADLEY MICROVISION

Microvision, from Milton Bradley, is a complete nonvideo cartridge game system that is handheld and runs on batteries. It has its own miniature screen with easily readable LCD display. The unit comes with the Block Buster game, (Fig. 2-33) which challenges you to knock down a wall, block by block, using a paddle to swat a ball across the screen.

The design is an alternative to the video screen. Cartridges are inserted by holding them at an angle, sliding the top of the cartridge



Fig. 2-33. Microvision game system with Block Buster game cartridge (courtesy Milton Bradley).

into a slot located at the top of the console, and then by pressing it into place. The screen contrast is adjusted by means of the contrast control knob located at the back of the unit (Fig. 2-34).

There are a variety of cartridges available. In the Mindbuster game, you have to try to solve two different puzzles, or you can set up your own puzzle. If you are playing Rings, you have to try to surround small black squares with large ones. When you play Lights Out, you have to eliminate all the squares and get a clear screen. Every move you make is tracked by the computer. A sound is heard to let you know you have won, when you have either surrounded the target blocks or turned off all the lit squares.

The Baseball game offers you the opportunity to play ball according to Major League rules or to test your batting skills against the computer. There are two skill levels. The object is to get the highest score in nine innings of play.

Sea Duel is a unique strategy game that pits a destroyer against a submarine in a naval battle of wits. You can play against the computer or against another opponent. When you play against the

computer, the computer can be either the sub or the ship. The unit features a unique screen action called multiple simultaneous movement, allowing you and your opponent to program your moving and firing actions at separate times, while the screen displays the actual battle action taking place. This type of movement design offers no advantage to the player who takes the first turn.

Each player has two-segmented programming of moving and firing action. When both players have finished programming, the battle action takes place. The vessels move into the firing positions that were entered for them in the first segment of programming and fire at one another. The vessels move into the firing positions programmed in the second segment and fire again. The score flashes on the screen. Each player programs two additional segments, and the battle continues. A score of six hits or more determines the winner of the battle.

The segmented programming of each vessel is a unique procedure; it's like moving pieces on a chess or checkers board. Each programmed move uses one unit of fuel (in the limited skill level, each vessel gets 18 units of fuel, and in the skill level, 12 units), so the programming has to be done skillfully in order to conserve fuel.

The firing power of each vessel is different. The destroyer's firing pattern covers an area three squares wide but is limited to a

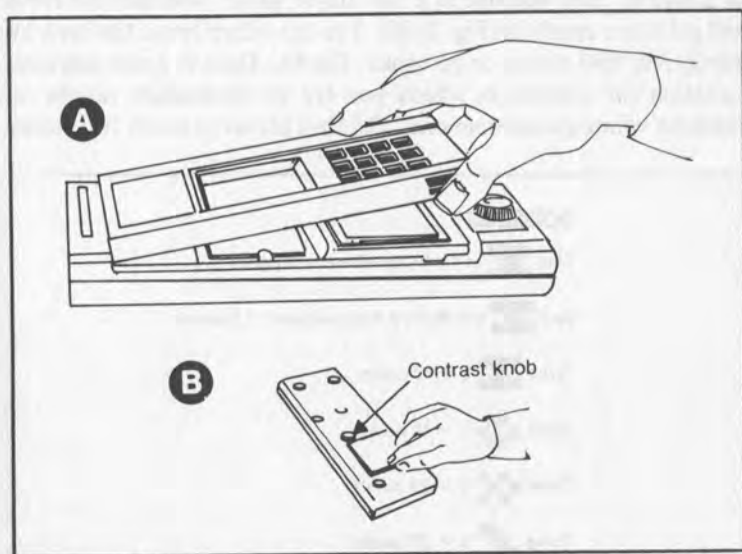


Fig. 2-34. (A) Inserting a game cartridge into Microvision unit; (B) adjusting liquid crystal screen contrast.

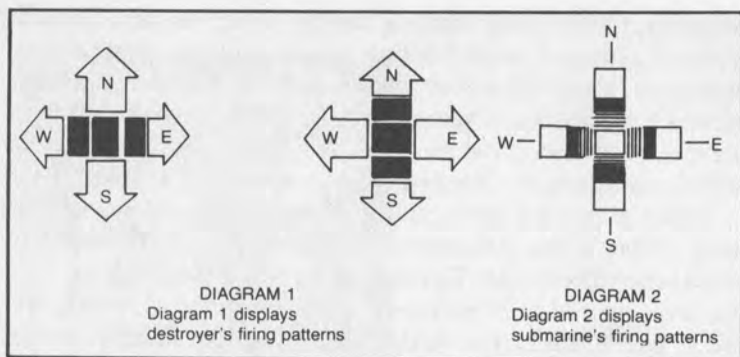


Fig. 2-35. Firing patterns of sub and destroyer in Sea Duel game from Milton Bradley.

nine square distance. The submarine's firing pattern covers a width of only one square but is not limited to distance (Fig. 2-35).

Connect Four is a strategy game. The object is to be the first player to get four markers in a row. You can play against the computer or against another player.

Although the Vegas Slots game may not have the same odds as the slot machines in Las Vegas, it gives you the same feeling. There are three game variations: Slot Machine, Double Dare, and Take It or Leave It. Slot Machine is a one-player game. You spin the reels and get three symbols (Fig. 2-36). You can either break the bank by going over 999 points or go broke. Double Dare is a slot machine variation for players in which you try to accumulate points by spinning winning combinations. The first player to reach 100 points

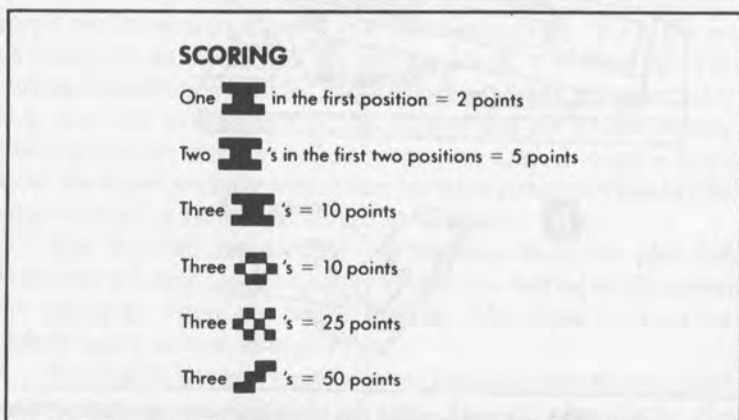
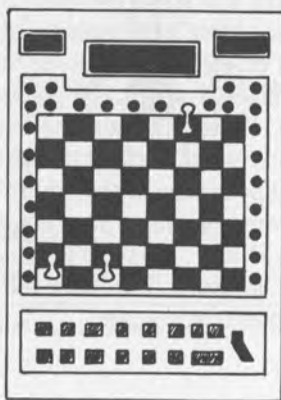


Fig. 2-36. Slot machine symbols in Milton Bradley's vegas slots game.

after both players have had the same number of turns wins the game. Take It or Leave It is also a two-player game and a variation of Double Dare. In this game, the center reel will be covered, and you have the option of either uncovering this reel or leaving it covered. The first player to reach 200 points wins the game.

In the Pinball and Bowling games, the computer controls a ball that is moving from one end of the field to the other. You control the movement of the ball by means of the control knob. The object in Bowling is to knock down as many pins as possible each time you "release" the ball. In Pinball, you have to let the ball bounce off the paddles into the four bumpers. The more the ball ricochets off the bumpers, the more points you score.

Chapter 3



Board Games

Board games, such as chess, checkers, and backgammon, use a board, or a computer simulated board, for game play. Although bridge does not as such need a board for play of the game, a table or other flat surface is used, and this game, therefore, is included in the board-game category.

STOP THIEF

STOP THIEF is a board game in which apprehending the criminal depends upon your being in the right place at the right time. To get there requires a combination of luck (from rolling the dice) and skill (from knowing where to move and when). It is a game of deduction, careful scrutinization of clues you receive, and weighing of evidence.

STOP THIEF is an unusual combination of board game and computer game. You are a private detective armed with an Electronic Crime Scanner crime detection unit. When you press the clue button on the scanner, the display reveals the street or building in which the crime is taking place and monitors the scene of the crime for sound. You hear the thief as he breaks a glass window. On the board, the chase is on. Your opponents, other detectives, are joining in the pursuit. You win the game when you track the thief down and arrest him before the other detectives do. The winner is the player who earns \$2,500 in reward money.

The game consists of a game board, 2 dice, 4 playing pieces in

different colors, 8 detective licenses, 10 wanted posters, 32 sleuth cards, reward money, and the Electronic Crime Scanner unit. Before starting the game, you can familiarize yourself with the sounds and the display on the scanner by pressing a clue button. You hear the sound of the thief crossing a floor, opening a door, breaking the glass window, running along the street, and riding the subway. You can also hear the "arrest" sounds, such as sirens wailing and warning shots.

At the start of the game, when it's your turn, you must press the clue button once, listen for a sound clue, watch the display, and share the information with the other players (detectives). During subsequent turns, you may make your moves in any order you wish. You can roll the dice, play one of your sleuth cards, or move your playing piece in any direction you want.

STOP THIEF retains the competitive nature of the old-fashioned board game, while combining it with today's computer-controlled challenges.

ELECTRONIC DETECTIVE

Twenty characters are together in a large city. Bang! Bang! Shots ring out. A body lies alone at the docks. The funeral dirge sounds. One character has been murdered, and the remaining 19 colorful characters at the scene of the crime flee to other parts of town. Four locations each have four suspects, one location has three suspects, one location has the victim only, and the murderer is never where either the weapon is hidden, nor where the body was found. The possible locations are an art show, a box at the theater, a card party, the docks, the embassy, or a factory. There are different locations for each of the places, three on the west side and three on the east side of town: uptown, midtown, and downtown.

In Electronic Detective, from Ideal Toy Corp. (Fig. 3-1), you are one of the detectives assigned to the case. You must interrogate the suspects and compete with the other detectives, using logic and deduction, to be the first to identify the murderer. You have some basic facts to work from. There are never more than two male and two female suspects at any location, and the two suspects of the same sex at any location always have one odd number and one even number. Thus, each suspect has a different combination of characteristics, including sex, location, and number.

To solve the crime you must get the murder facts and find the one suspect who fits these facts. To determine which suspect is the murderer, you must find the fingerprints on the murder weapon



Fig. 3-1. Electronic Detective from Ideal Toy Corp. (courtesy Ideal Toy Corp.).

belonging to an odd-numbered or even-numbered suspect. You must know if the murder weapon is a .38 or .45, where it is located, and who was at that location.

How do you go about it? You use the computer to interrogate the suspects to find out where the suspect fled and (sometimes) who else was there. Questions from each of the 20 suspect cards provide other vital facts. The answers to the questions on the suspect cards provide you with vital information to help you deduce the identity of the murderer. You ask the questions, and the computer has the answers. Get careless, and you'll ask for useless information. Ask a smart question, and you'll have a key fact.


A case fact sheet (Fig. 3-2) helps you study the suspect's statements. The fact sheet is divided into four sections: the murder facts, where you record vital facts; who was there, where you record the whereabouts of the murder victim, weapons, and the various suspects; who said what, where you record and cross reference alibis and answers; and who did it, where you write your solution to the crime prior to making an accusation. You logically follow the tangled web of evidence. If you make the correct accusation, sirens will sound. If not, you're out of the game.

GARGOYLES & GOBLINS

The tribes of Gargoyles & Goblins (Fig. 3-3) are in a fierce

battle for control of their planet. The magical sphere, the game board, is the battlefield of that planet. The object is to zap all your opponents and be the last survivor of the battle.

When you play against another opponent you get 10 playing pieces. Each player must move a total of three spaces on a turn; one piece can move three spaces, or you can divide the three moves among one, two, or three pieces. You can move only to adjacent spaces, in any direction, but you cannot jump (Fig. 3-4).



ELECTRONIC DETECTIVE



CASE FACT SHEET GAME DETECTIVE (your name)

1 THE MURDER FACTS

WHO? The victim was (name) The body was found at PLACE







SEX OF THE MURDERER? Male Female

WHERE DID THE MURDERER GO? 1. West Side 2. East Side
 3. Uptown 4. Midtown 5. Downtown

WEAPON USED? 38  45 

FINGERPRINTS? Odd # Even # Odd # Even #


2 WHO WAS WHERE?

	A 	B 	C 	D 	E 	F 
PLACE	Art Store Man Woman	Sex at Threes Man Woman	Card Party Man Woman	Docks Man Woman	Embassy Man Woman	Factory Man Woman
ADDRESS OF PLACE	<input type="checkbox"/> West Side <input type="checkbox"/> East Side	<input type="checkbox"/> Uptown <input type="checkbox"/> Midtown <input type="checkbox"/> Downtown	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45
WEAPON LOCATION	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45	<input type="checkbox"/> 38 - 45

3 WHO SAID WHAT?

	Men and their Statements		Women and their Statements
1	Lenny Little <input type="text"/>	1 1	Ivy Little <input type="text"/>
2	Al Ferook <input type="text"/>	1 2	Lucy Tumble <input type="text"/>
3	Pope Peres <input type="text"/>	1 3	Piper Peres <input type="text"/>
4	Tony Roshell <input type="text"/>	1 4	Sina Roshell <input type="text"/>
5	Mickey O'Malley <input type="text"/>	1 5	Sileen Steier <input type="text"/>
6	Max Fineluggle <input type="text"/>	1 6	Jean Fineluggle <input type="text"/>
7	Ripp Rapp <input type="text"/>	1 7	Rosa Pettie <input type="text"/>
8	Buster Bailey <input type="text"/>	1 8	Doris Dill <input type="text"/>
9	Rocky Roll <input type="text"/>	1 9	Candy Roll <input type="text"/>
1 0	Ling Tang <input type="text"/>	2 0	Sing Wong <input type="text"/>

4 WHO DID IT?

I Accuse Suspect 

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 IDEAL TOY CORPORATION 1978, HOLLIS, NEW YORK 11423


SA-3342 

Fig. 3-2. Case fact sheet for Electronic Detective game (copyright by Ideal Toy Corp.; reproduced courtesy Ideal Toy Corp.).



Fig. 3-3. Gargoyles & Goblins by Ideal Toy Corp. (courtesy Ideal Toy Corp.).

You may attack an adjacent enemy piece by pressing down firmly on the opposing adjacent piece, or pieces, and on your own piece at the same time. A successful attack means that one of the spaces is a hidden “flash” point, at which time the core master goes

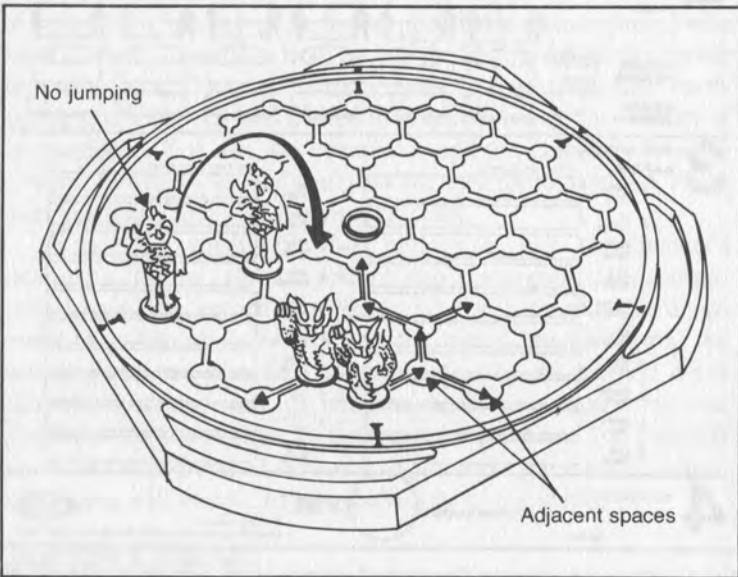


Fig. 3-4. Legal moves of Gargoyles & Goblins game.

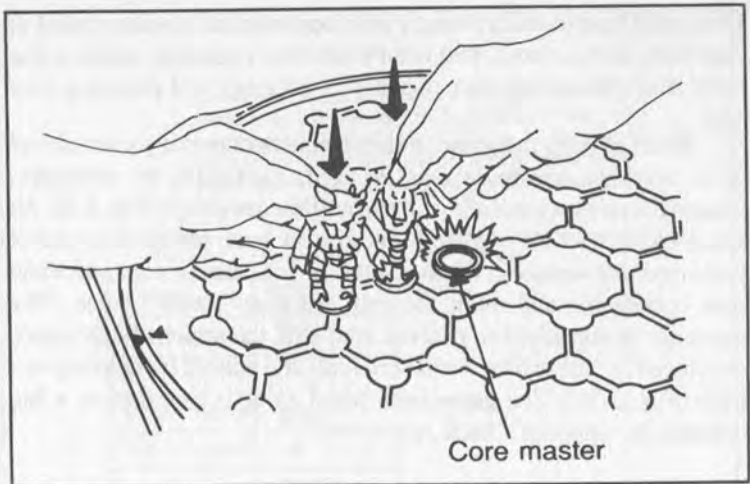


Fig. 3-5. Victorious attack in Gargoyles & Goblins.

into action. Its light flashes, and a rapid sequence of victory beeps sounds. You have zapped the enemy. If the core master does not go off, your attack was not successful, and you proceed with your turn if you have any turns left (Fig. 3-5). When you have zapped all your opponent's pieces, you have won the game.

THE GENERALS

The Generals (Fig. 3-6), from Ideal Toy Corp., is an electronic game of strategy and suspense. Playing against an opponent, you command a 21-piece army (Fig. 3-7). The object of the game is to capture your opponent's flag or move your flag to your opponent's back row. You have to devise a winning strategy to outmaneuver your enemy. The risk is that the strength of each piece is hidden until an attack is made by either side. Even then its identity is kept secret until the computerized arbiter goes into action to determine who is the winner of the attack.

The battlefield consists of a board (Fig. 3-8) on which you arrange all 21 pieces of your army in the first three rows. Your opponent does the same thing. The initial setup of your army can be a determining factor in winning or losing the game. You have to understand the power of each of the playing pieces. For example, a private, while being the lowest ranking piece, is the only piece that can eliminate agents. Your initial tendency might also be to surround your flag with high ranking pieces as a protective barrier.

This could lead to infiltration by your opponent at a weaker point in your line. In this game, you must think like a general, while at the same time evaluating your opponent's strategy and planning your own.

When playing the game, a turn consists of moving your pieces to an adjacent square, either forward, backward, or sideways. Diagonal moves are not allowed and neither are jumps (Fig. 3-9). An attack consists of moving your piece to a square occupied by one of your opponent's pieces. When you do so, you remove your piece and your opponent's and mark the spot with an "attack" piece. The computer is consulted to find out who won the attack. Both pieces are placed in "the arbiter" which reveals the winner by lighting up a LED (Fig. 3-10). The game ends when a flag is captured or a flag reaches the opponent's back row.

PLUS ONE

Plus One (Fig. 3-11), from Milton Bradley, is an electronic board game. Plus One never forgets. You tumble a computer back and forth, building and retracing a path on the board that grows more complex with each turn. You have to remember the trail Plus One has left behind.

















When you play against one opponent, you alternate turns. You



Fig. 3-6. The Generals (courtesy Ideal Toy Corp.).

Know Your Army!

Each player has a 21 piece "army" of the same color, ranging in rank from 5 Star General to Private, including two powerful Agents. Victory or defeat for each attack is dependent on the rank or power of the piece. Each army is composed of the following—listed by rank:

The Army	Insignia	No. of Pieces	Power	
5 Star General		1	These pieces eliminate any lower ranking piece. They cannot eliminate the agents.	
4 Star General		1		
3 Star General		1		
2 Star General		1		
1 Star General		1		
Colonel		1		
Lt. Colonel		1		
Major		1		
Captain		1		
1st Lieutenant		1		
2nd Lieutenant		1		
Sergeant		1		
Private		6		This is the only piece that can ELIMINATE THE AGENTS. It can also capture the Flag.
Agent		2		Eliminates ALL pieces EXCEPT THE PRIVATES. Agents may also capture the Flag.
The Flag		1	The Flag can be captured BY ANY PIECE including the OPPOSING Flag (if the opposing Flag initiated the attack).	
Attack		1	Use to mark position of piece under attack.	

NOTE: When pieces of equal rank are involved in an attack both pieces are eliminated from play. In the case of one Flag attacking the other—the attacking Flag is the winner.

Fig. 3-7. 21-piece army of The Generals game.

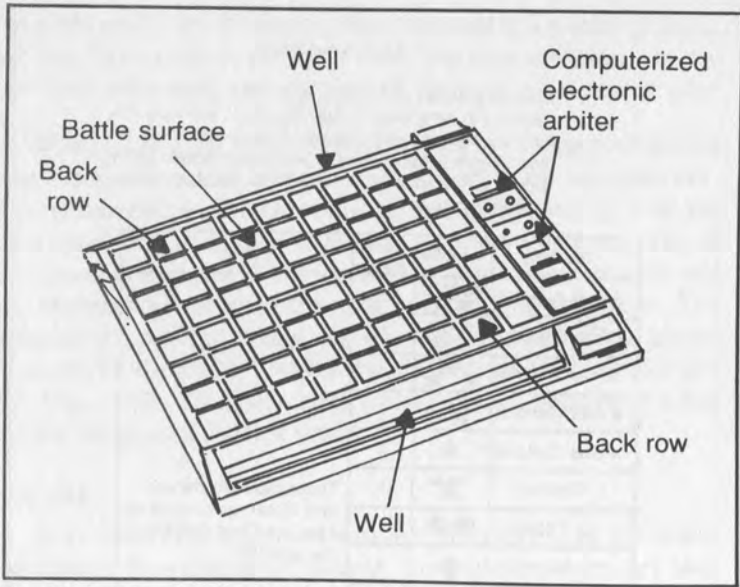


Fig. 3-8. Layout and components of The Generals.

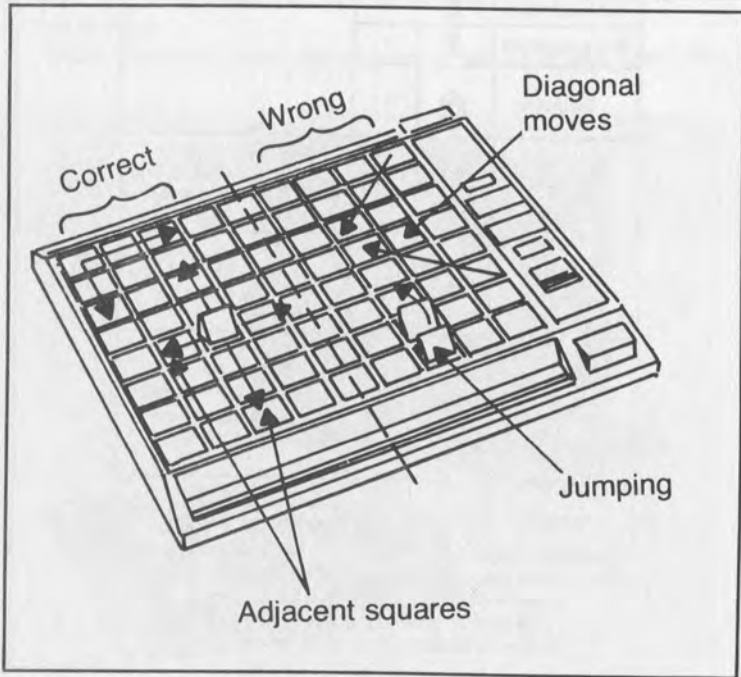


Fig. 3-9. Legal moves of playing pieces in The Generals.

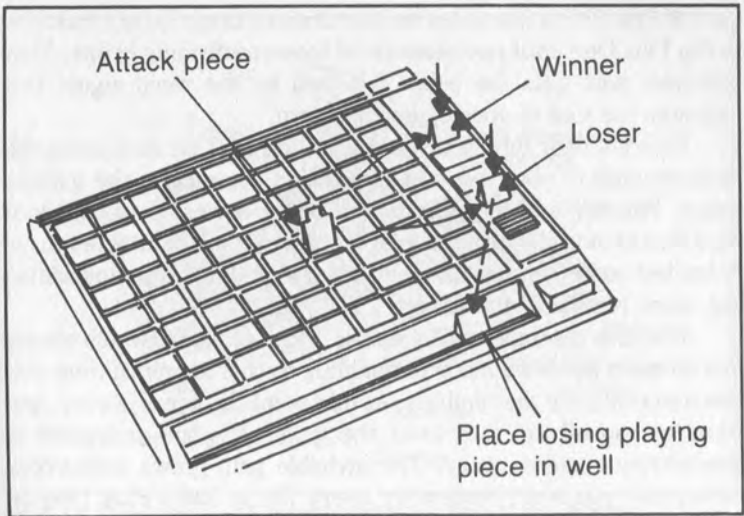


Fig. 3-10. Using "the arbiter" in The Generals.

place the Plus One unit onto any space on the game board, and after you've turned the switch to on, you flip Plus One to an adjacent space. You hear a beep, followed by a rapid signal indicating your turn has ended. Your opponent now tumbles Plus One back to its original starting position, hearing a beep while doing so, and adds a new tumble onto an adjacent space in any direction. When flipping,



Fig. 3-11. Plus One from Milton Bradley.

each of Plus One's four sides emits a distinct beep. Do not continue to flip Plus One until you hear one of those confirming beeps. Your opponent now gets the beep, followed by the rapid signal that indicates the end of your opponent's turn.

Now it's your turn again, and you flip Plus One back along the invisible path to your last ending position listening to the guiding beeps. You now add one more tumble to the series. Your opponent flips Plus One back down the ever increasing path of tumbles to his or her last ending position, listening to the guiding beeps and adding one more tumble to the series.

You both continue to play until a "razz" is heard, which means that an error has been made in tumbling or that too much time was taken to complete the tumbles. At that point the game is over, and whoever caused the razz loses the game. It's truly a game of concentration and memory. The invisible path grows with every move, and you must remember every flip to keep Plus One on course.

ELECTRONIC BATTLESHIP

Electronic Battleship (Fig. 3-12), from Milton Bradley, is a game of electronic hunt and seek on the high seas. Players command their own fleets, setting the controls on the console to fire on sectors of the board where their opponent's ships may be hidden.

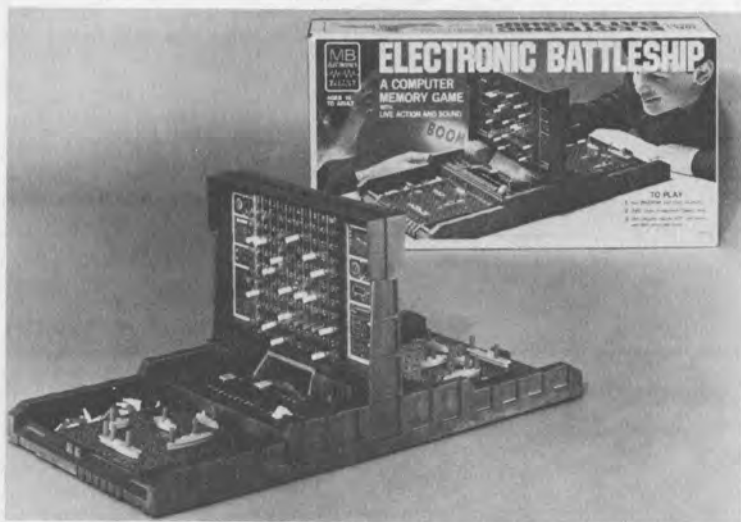


Fig. 3-12. Electronic Battleship from Milton Bradley (courtesy Milton Bradley Co.).

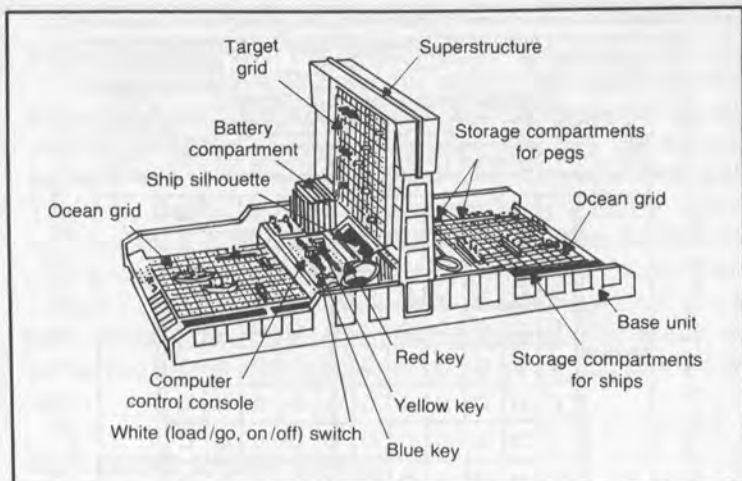


Fig. 3-13. Game setup of Electronic Battleship from Milton Bradley.

Pressing the fire button gives quick results; hits are indicated by a flash of lights and the sound of realistic explosions. Each player has one carrier, occupying five holes in the grid; a battleship, occupying four holes: one destroyer, occupying three holes; a submarine, occupying three holes, and a PT boat, occupying two holes. Each player also has two runners of white pegs (84 total) and one runner of red pegs (total 42 pegs). Figure 3-13 illustrates the setup of the game.

To play the game, you and your opponent must enter the coordinates of your ships in the computer's memory bank. The ocean grid is numbered 1 through 10 horizontally and the lettered A through J vertically (Fig. 3-14). You read down and across to get the coordinate. In Fig. 3-14, the coordinate is J-6. The number of holes in the ship, when lined up over the holes on the ocean grid represents the number of coordinates that must be entered for that ship. The carrier shown in Fig. 3-14 has five holes, and you must enter five coordinates. This has to be done for all your ships. Your opponent must do the same.

The upright target grid facing you represents your opponent's ocean grid. On it you have to choose a target, which you mark with one of your white pegs. You then enter the target's coordinates in the same manner you entered your own ship's coordinates.

You fire a missile. If you fire a hit, the computer responds with a flash of light and the sound of an explosion. You have hit a section of one of your opponent's ships. Announce the coordinates to your

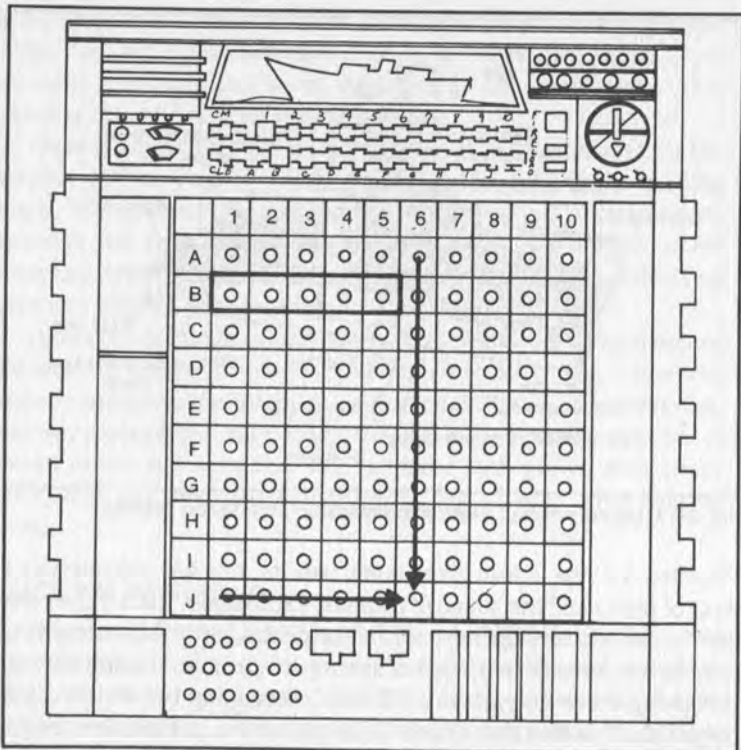


Fig. 3-14. Assigning of coordinates in Electronic Battleship from Milton Bradley.

opponent, and your opponent must tell you what ship was hit, carrier, submarine, etc., and place a red peg in the corresponding hole on the ship. Record your hit by replacing the white peg on your target zone with a red one. If you fire a miss, you hear the sound of the missile, but there is no flash of light or explosion. Leave the white peg in place on your target grid so you will not aim at that target again. You do not have to announce this coordinate to your opponent. You continue the game until one player has sunk all five ships of the other player.

GREAT GAME MACHINE

The Great Game Machine from Applied Concepts Inc. is a portable microprocessor game machine that accepts game cartridges, such as checkers, chess, and reversi. The unit has a compartment for one game cartridge and a pocket for the matching keyboard overlay. You play a game by inserting the cartridge in its

compartment, slipping the matching overlay in the keyboard pocket, and setting up your game board (Fig. 3-15).

A feedback/move indicator that consists of a large fluorescent display provides instant feedback to confirm game moves you have entered. In addition, it indicates the moves the computer desires to make, as well as relevant comments about the game in progress. The game board has alpha and numeric designations to indicate keyboard entry for particular moves in a game. A memory position allows continuous play of game cartridges. When you finish playing one cartridge and want to continue play on another, you can stop and then continue the computer's thinking process. This feature also allows you to interrupt a game in progress for continuation at a later time.

ODIN ENCORE MASTER REVERSI

Odin Encore is a self-contained computerized game of Reversi. Applied Concepts named its game of Reversi after the greatest of Norse gods, Odin. Odin was revered as the master strategist, a reputation he acquired because of his persistent attacks and counterattacks on any who would engage in battle.

Odin Encore (Fig. 3-16) can be played by two people on a 64-square game board. There are 64 disks, which are black on one side and white on the other. The object of the game is to have a

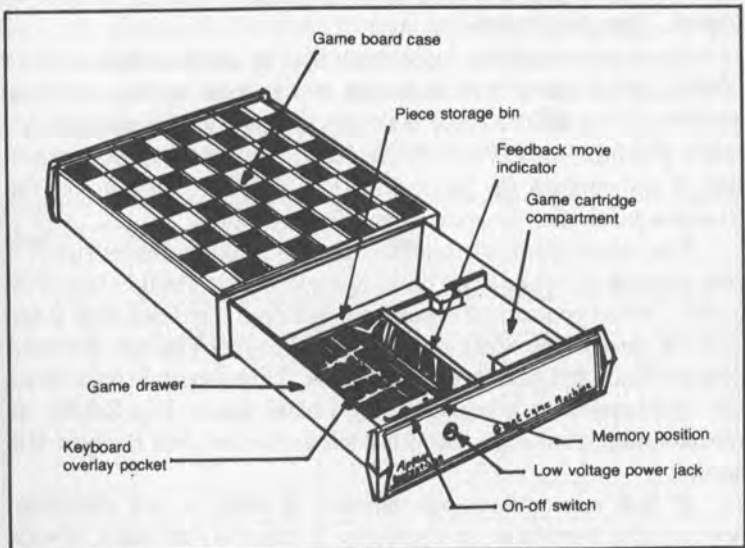


Fig. 3-15. The Great Game Machine from Applied Concepts Inc.

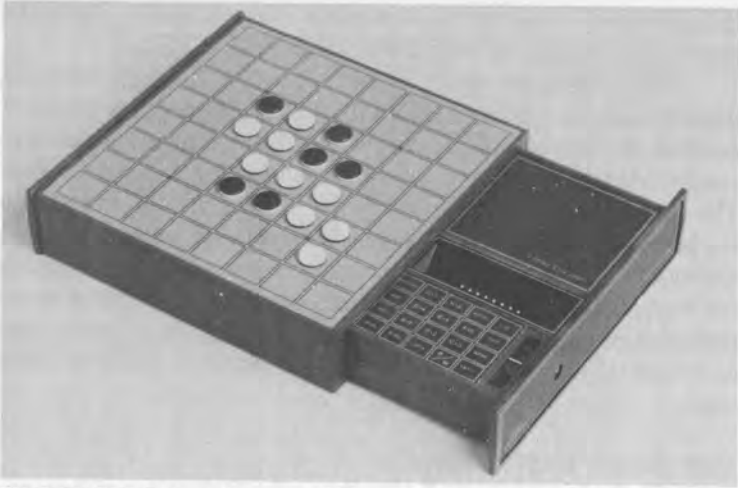


Fig. 3-16. Odin Encore, the game of Reversi by Applied Concepts Inc. (courtesy Applied Concepts).

majority of the disks on the board at the end of the game in your color. The game is started with a disk on each of the center four squares of the board. Two are white and two are black. Moves are made by placing a single disk of your color on an empty square which is adjacent to one or more of your opponent's disks and causes one or more of your opponent's disks to be outflanked. This can be done in any of eight possible directions.

You can outflank your opponent's disk by placing a disk adjacent to it in a direct line with another disk of your color. In Fig. 3-17, you are white with disk A. Your disk was already on the board with a black disk next to it (Fig. 3-17A). Now, you put down your white disk B and outflank the black disk (Fig. 3-17B). You can now flip over the black disk to your color (Fig. 3-17C).

You can outflank any number of disks in one or more rows. A row consists of one or more disks in a continuous straight line (Fig. 3-18A). When you're white, black can put down the black disk B and outflank your three white disks. Your opponent can now flip your disks to black and gain three black disks. This cannot be done when the continuous line is broken up by a blank space (Fig. 3-18B). In this situation, your opponent is not allowed to put disk B where it is shown.

A disk can outflank any number of disks in any direction, horizontally, vertically, or diagonally. It can also outflank in several directions at the same time. In Fig. 3-19, your white disk C out-

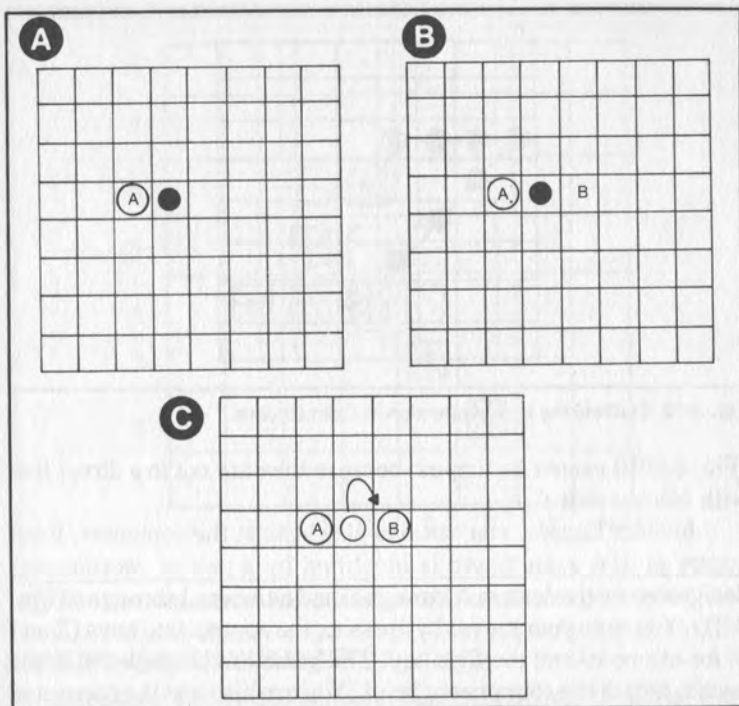


Fig. 3-17. Outflanking an opponent in the game Odin Encore.

flanks the black disks between B and C, and between A and C. A disk can be outflanked only as a direct result of a move, and it must be in the direct line of the disk just placed on the board. In Fig. 3-20A, black has put down disk A. In this case black can flip (outflank) only your two white disks between A and B. Your other two white disks

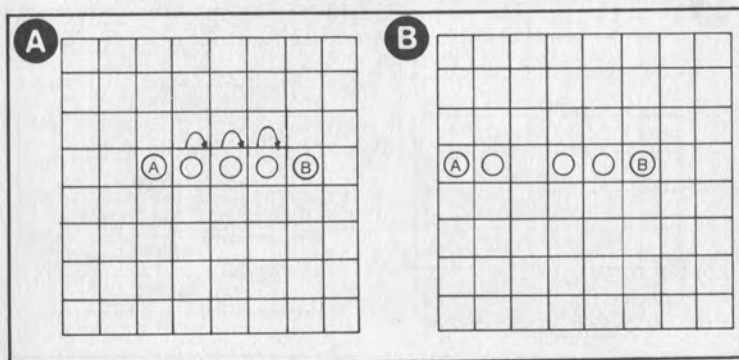


Fig. 3-18. Legal outflank moves in the Odin Encore game.

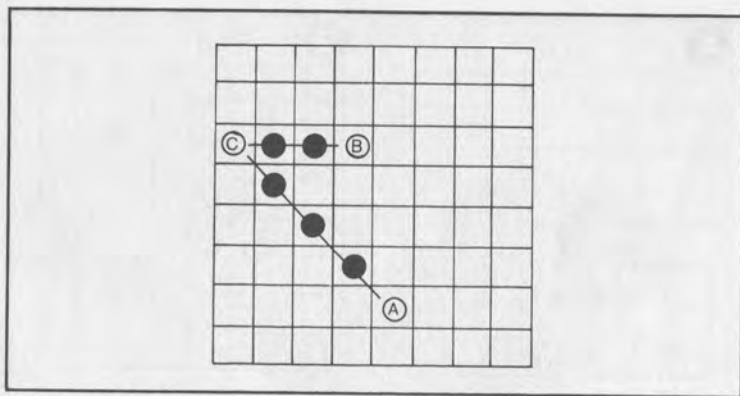


Fig. 3-19. Outflanking in any direction in Odin Encore.

(Fig. 3-20B) cannot be flipped, because they are not in a direct line with black's disk A.

In Odin Encore, you can also play against the computer. Each square on the game board is identified by a pair of coordinates, designated by the letters A through H and numbers 1 through 8 (Fig. 3-21). You code your moves by pressing the appropriate keys (E and 6, for example) and the flips key. The game can be played at eight levels, with 8 the tournament level. You can also use the computer as a tutor to see what it would do in your place.

Odin Edition (Fig. 3-22) is similar to the game described above; however, it is not a self-contained computer game, but utilizes a cartridge to be used with the Great Game Machine. The cartridge is simply inserted in the drawer part of the unit (Fig. 3-23); otherwise, all the Odin rules apply.

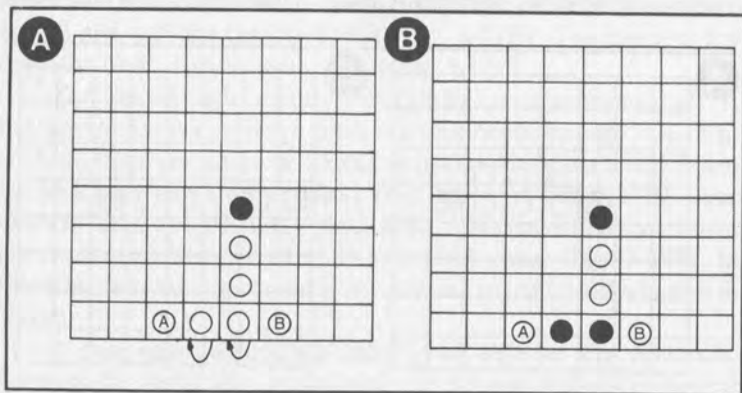


Fig. 3-20. Outflanking as a direct result of a move in Odin Encore.

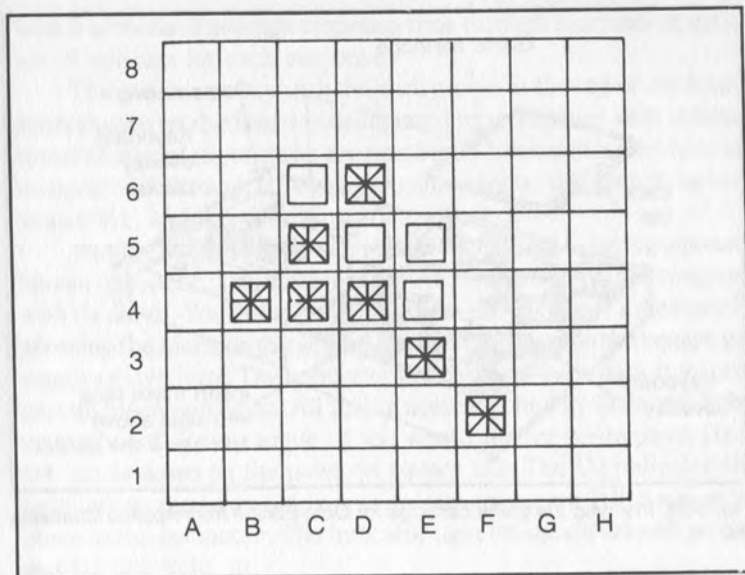


Fig. 3-21. Identification of coordinates on the Odin Encore game board.

SENSORY CHESS CHALLENGER

Sensory Chess Challenger (Fig. 3-24), from Fidelity Electronics Ltd. is a versatile and talented computerized chess-playing opponent. The playing surface, lights, and keys are provided only as a means of communication between you and the computer. This electronic game provides additional functions at any time, such as

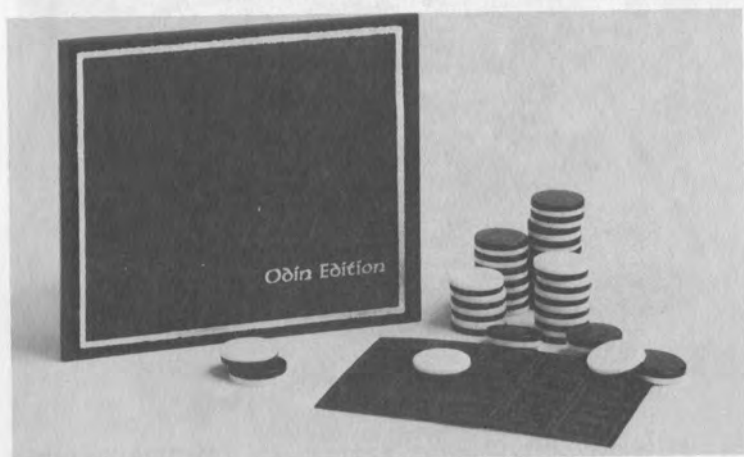


Fig. 3-22. Odin Edition cartridge game from Applied Concepts Inc.

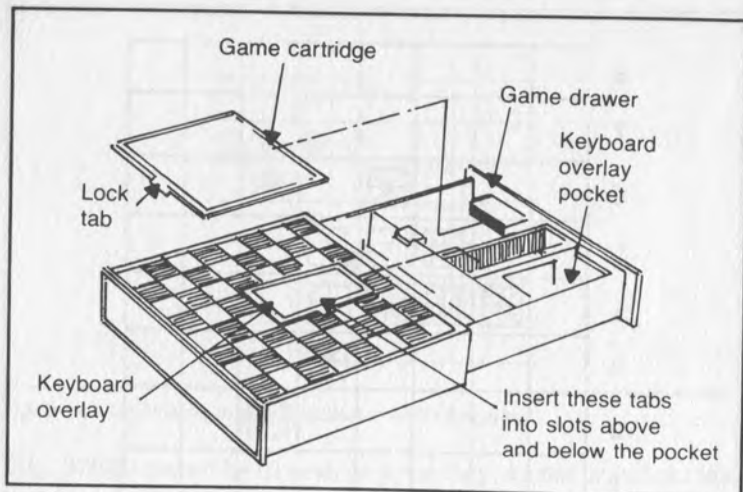


Fig. 3-23. Inserting the game cartridge for Odin Edition from Applied Concepts Inc.

position verification of the pieces. The problem mode lets you make piece and position changes or set up special problems to be solved, allowing you to change sides or the level of playing difficulty at any time during the game. There are eight levels of play from beginner

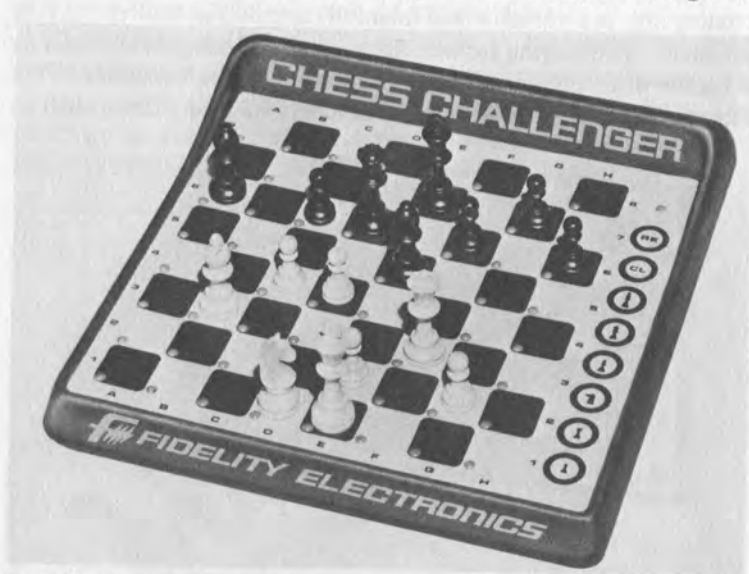


Fig. 3-24. Sensory Chess Challenger, a computerized chess game from Fidelity Electronics Ltd. (courtesy Fidelity Electronics Ltd.).

with 5 seconds of average response time through tournament giving you 3 minutes for each response.

The game is set up with the dark pieces at the top of the board. Each square on the board is designated in accordance with international chess notation; ranks are numbered 1 through 8, and files are designated A through H. When the game begins, the white king is on square E1, and the dark king is on square E8.

Playing chess with Sensory Challenger is like playing against a human opponent. You make your move, and the computer responds with its move. You enter your move into the computer's memory by pressing the piece on the square it sits on and then on the square you want to move it to. The computer indicates to you where it wants a certain piece moved to. All this is accomplished by little red lights on the board. For example, if you want to move white pawn D2 to D4, press down on the pawn on square D2. The D2 indicator will light. Move the pawn, and press it down on square D4 to signal the move to the computer. The indicator light on square D2 will go out, and D4 will light up.

The computer shows you which piece it wants moved by lighting the square. You make the move for the computer by press-



Fig. 3-25. Electronic Chess from Tryom Inc.

ing the piece down on the lighted square and moving it to the square that lights up, which is the square chosen by the computer.

The problem mode permits you to perform numerous special moves at any time during the play. You can set up a particular problem, a special move situation, or a specific configuration of pieces. En passant and castling are also played and recognized by the computer. A most interesting feature is "changing sides." By pressing the dark king when it is your turn to move, the computer changes sides and let you know which move you should make. Press down on the white king, and the computer decides on its next move. In this fashion, the computer plays for both the light and dark side.

ELECTRONIC CHESS

Electronic Chess (Fig. 3-25), from Tryom Inc., is another chess battle that puts you against the computer or the computer against itself. There are two components: the board and magnetic playing pieces and the computer with keyboard. The codes on the keyboard correspond to the setup as shown in Fig. 3-26.

Black king	=	BK	White king	=	WK
Black queen	=	BQ	White queen	=	WQ
Black bishop	=	BB	White bishop	=	WB
Black knight	=	BN	White knight	=	WN
Black rook	=	BR	White rook	=	WR
Black pawn	=	BP	White pawn	=	WP

8	BR	BN	BB	BQ	BK	BB	BN	BR
7	BP	BP	BP	BP	BP	BP	BP	BP
6								
5								
4								
3								
2	WP	WP	WP	WP	WP	WP	WP	WP
1	WR	WN	WB	WQ	WK	WB	WN	WR
	A	B	C	D	E	F	G	H

White corner square

Fig. 3-26. Setup of pieces corresponding to keyboard layout of Electronic Chess.

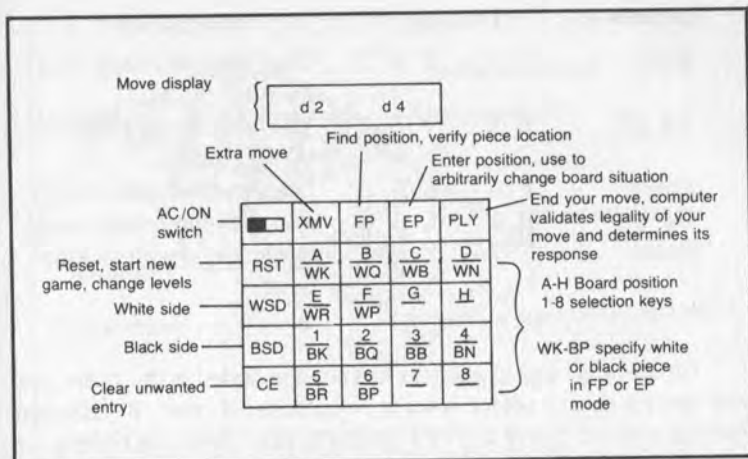


Fig. 3-27. Keyboard layout of Electronic Chess from Tryom.

Keyboard layout is illustrated in Fig. 3-27. You enter the FROM move to the TO move, which then appears on the display. There are six levels of difficulty, plus level 7 for thorough evaluation and level 8 to solve mate in two problems taking up to 10 hours to solve a complicated problem. An opening book of master moves is built in to Electronic Chess, such as King's Indian Defense, Cambridge Springs Defense, Caro-Kann Defense, and Petroff's Defense.

MORPHY ENCORE MASTER CHESS

Morphy Encore from Applied Concepts, is a self-contained computerized chess game. The game unit can be opened and set up in a matter of seconds by pulling out the game drawer and setting up the game board (Figs. 3-28 and 3-29). A fluorescent display provides instant feedback to confirm game moves you have entered and the moves the computer wants to make. The game board has alphanumeric designations to indicate keyboard entry for particular moves made in the game.

The keys are identified with both letters and numbers corresponding to the rank and file numbers of the game board allowing you to enter your moves. The display indicates the moves to and from and the sequence of the moves, for example:

Operation	Display	Description
Power on	- 1	After "move"
E2 E4	E 2 - E 4 1	You advance king pawn

Operation	Display	Description
Enter	G 8 - F 6 2	Computer develops king knight
E4 E5	E 4 - E 5 2	You advance pawn-threatening knight
Enter	F 6 - D 5 3	Computer advances knight
B1 C3	B 1 - C 3 3	You develop queen knight
Enter	E 7 - E 6 4	Computer develops king pawn
etc.		

An opening book of masters has been included in the game, and you can randomly select from a repertoire of over 50 different opening moves. There are two modes of play, best and normal. In the best mode, the computer always plays the single move it considers best; no variety is included in this mode. In the normal mode, the computer does not always make the same response to any given move, but selects a move from a number of moves it considers to be best.

There are eight levels of play. Level 0 is for beginners, and the computer finds any mate in one at this level. Level 1 is a fast paced



Fig. 3-28. Morphy Encore computer chess from Applied Concepts (courtesy Applied Concepts).

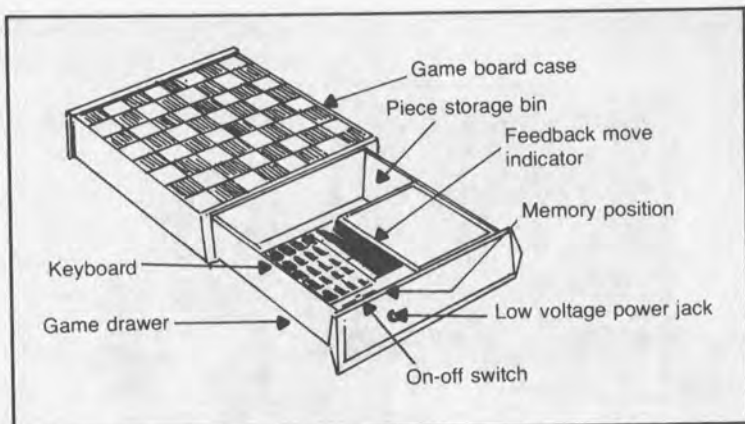


Fig. 3-29. Components of Morphy Encore chess game from Applied Concepts.

game with the playing strength at about USCF 1000. At level 2 the whole game should last about 1 hour, with the playing strength at about USCF 1200. At level 3 the computer can solve any mate in two problems; playing strength is about 1400. At level 4 the computer has no trouble making 40 moves in 90 minutes. The computer can solve any mate in three at level 5, providing solid chess approaching the 1800 level. At level 6 the computer is more like postal chess; a solid game could last up to a month. At this level the computer can find some mate in four problems. Level 7 is tournament level designed to play 30 moves per hour. Tournament level 8 is designed to play 40 moves every 2 hours.

In Morphy Encore, you can have the computer play against itself, using it as a tutor to show you which move you should have made against the computer's move. You can also stop the computer's thinking and force it to make a move by pressing the halt button. A built-in timer keeps track of the amount of time you or the computer have spent on the current move and the total time each has taken to play the game. You can also modify the board or play end-game strategies to practice against the computer.

Morphy Edition (Fig. 3-30) is similar to Morphy Encore, but it is a cartridge to be played on the Great Game Machine.

BORIS DIPLOMAT CHESS

The Boris Diplomat chess game (Fig. 3-31) was Applied Concepts' entry into the computerized chess game market. Moves are entered through the keyboard. Rather than having various levels of play, the computer performs deeper analysis of the moves by means

moves the computer is contemplating. The computer selects the best move when the response time has elapsed.

TANDY COMPUTERIZED CHESS

Tandy Computerized Chess (Fig. 3-32) is a self-contained computerized chess game from Radio Shack that is programmed to make the best move in each situation. The board has standard notation and plug-in pieces, and you can play either against the computer or a manual game.

The game is controlled using 15 keys and a power switch (Fig. 3-33). To make and enter moves, you'll use the A1 through H8 keys, plus the enter key. Each time you make a move, you'll have to press four keys. The first press automatically enters a letter, the second a number, the third another letter, and the fourth press enters a number. If on your first turn, you move a knight from square B1 to C3, you do this by entering the square where the knight is located now, B1, and then entering the square you want to move the piece



Fig. 3-32. Tandy Computerized Chess game (courtesy Radio Shack).

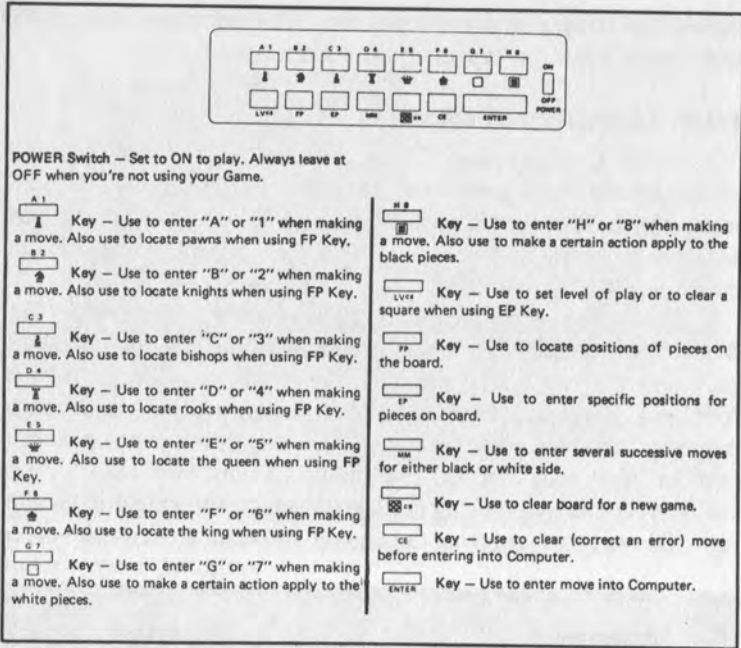


Fig. 3-33. Keyboard layout of Computerized Chess from Radio Shack.

to, C3. The keys you press and the resulting display are shown in Fig. 3-34.

The computer automatically moves its piece and displays the result on the display panel. The time it takes for the computer to

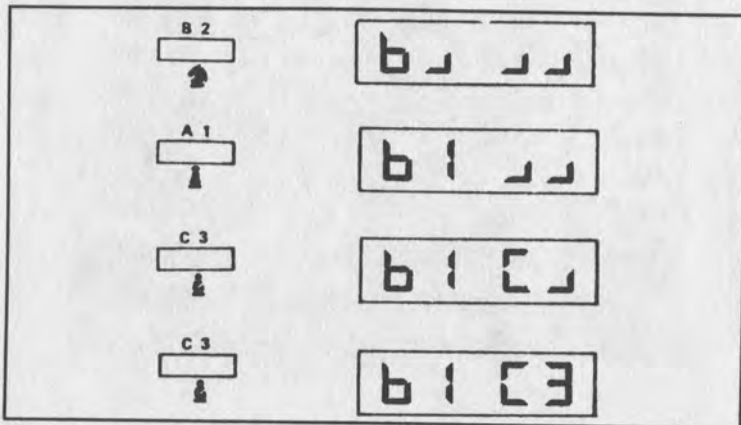


Fig. 3-34. Keyboard entry to move chess piece in Computerized Chess from Radio Shack.

evaluate and respond to a move at each level of play will vary. It responds faster to the opening moves, slows down during the middle part of the game, and speeds up at the end (unless there are some queens left on the board). At the eight levels of play the computer will evaluate and respond as follows: at level 1, response time is 2 seconds; at level 2, response time is 10 seconds; at level 3, response time is 25 seconds; at level 4 response time is 2 minutes; at level 5 response time is 4 minutes; at level 6, response time is 20 minutes; at level 7, response time is 40 minutes; and at level 8, response time is 3 hours.

You can change the side that has the next move, set up special positions on the chessboard, and compare positions on the chessboard with those stored in the computer's memory.

BORCHEK ENCORE MASTER CHECKERS

Borchek Encore is a self-contained computerized checkers game from Applied Concepts (Fig. 3-35) that provides instant feedback to confirm moves you have entered. It also indicates the moves the computer wants to make, as well as relevant comments about the game in progress, and a keyboard for entering moves into the computer (Fig. 3-36).

Each square on the game board is identified by a number in the lower right-hand corner of the square, and each move on the game board is identified by a pair of squares indicating from one square to

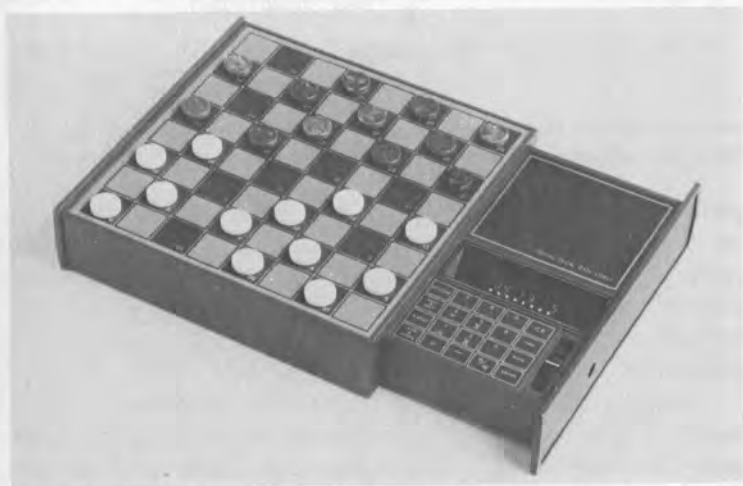


Fig. 3-35. Borchek Encore computerized checkers game (courtesy Applied Concepts Inc.).

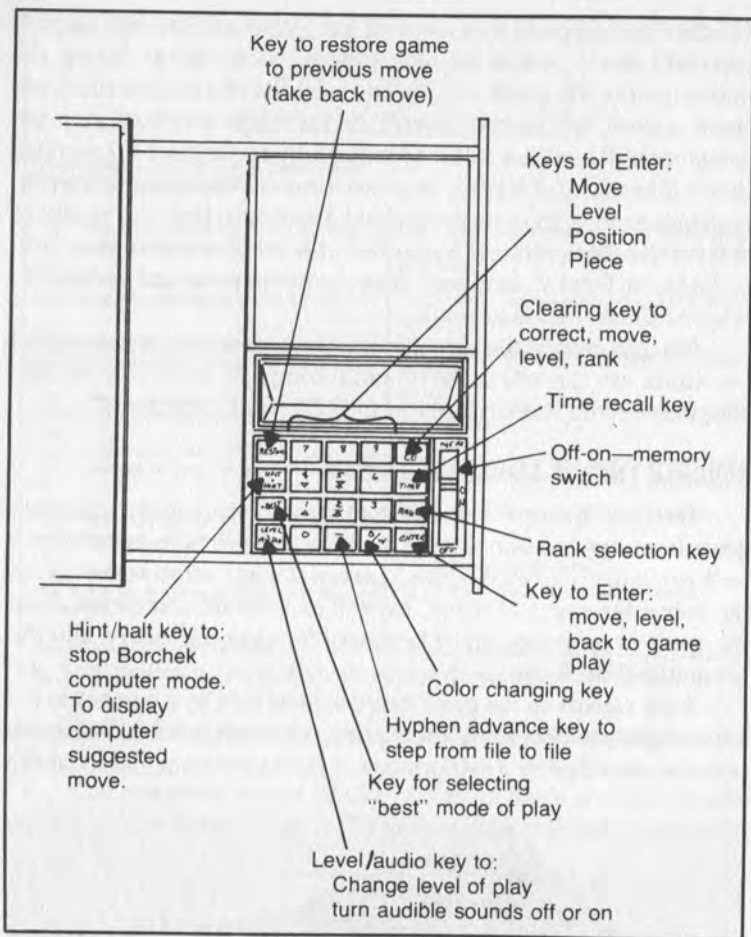


Fig. 3-36. Keyboard controls of Borchek Encore computerized checkers game.

another square. You make your move on the game board and key it into the computer by entering the number of this square you are moving from and then the number of the square you are moving using the multipurpose keys on the keyboard. The display also indicates the number of moves made in the game, such as move 1 and move 2.

Borchek lets you choose between two modes of play, best and regular. In the best mode, the computer always plays the single move it considers best, while in the normal mode, the computer selects a move it considers one of the best moves. You can take back moves during the play to take back blunders you have made, without

having to change the internal game board. You can follow the Three Move Convention in order to vary openings in the game. There are 142 different openings allowed, each consisting of three moves. You can vary the level of play, and you can change sides and let the computer play your side. You can use the computer as a tutor. You can stop the computer's thinking process by forcing it to make a certain move faster. If you wish, you can time the game or recall all the moves that were made during the game. You can modify the board to set up a particular problem or play out a variation on any game.

The Borchek Edition (Fig. 3-37) is a cartridge for use with Applied Concepts' game machine. The game has exactly the same features and play modes as the Borchek Encore checkers game, but it is not a self-contained computer game and must be played with the Game Machine.

CHECKER CHALLENGER

This self-contained computerized checkers game (Fig. 3-38) from Fidelity Electronics can be played on four different levels. In level 1, the computer is looking ahead one offensive and one defensive move and may make some tactical errors during the course of game play. In level 2, the computer is looking ahead two offensive and two defensive moves and requires an average of 5 seconds to respond with a countermove. In level 3, the computer is looking ahead three offensive and three defensive moves, requiring 25



Fig. 3-37. Borchek Edition cartridge checkers game (courtesy Applied Concepts Inc.).

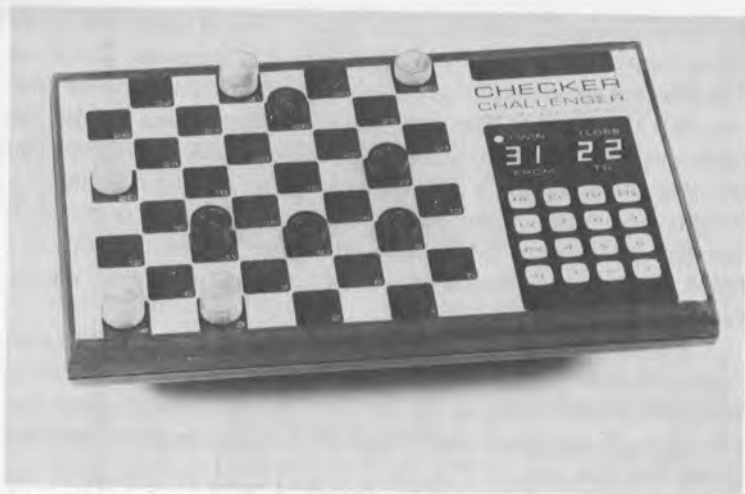


Fig. 3-38. Checker Challenger computerized checkers game (courtesy Fidelity Electronics).

seconds to respond. At this level, the computer plays a very sophisticated game of checkers. Level 4 is for very advanced players, since the computer looks ahead four offensive and three defensive moves. Response time is 90 seconds. At this level, you don't very often win against the computer.

The computer randomly chooses its moves throughout the game. Sometimes it chooses the well known book responses to counter your moves, and at other times it chooses a totally different approach. In certain move positions, the computer may choose among four or five move possibilities, while in other move positions, it will have only one or two possibilities.

Moves are entered through the keyboard (Fig. 3-39). If you want to move your piece from square 9 to square 13, you press 9, which appears in the FROM window, press the TO key, press 1 and 3, and press Enter. The number 13 appears in the TO window. The computer makes its move, which is also indicated in the window displays, and you simply move the computer's piece on the board. Illegal moves are indicated in the display with four dashes ----. Jumps must be taken when it is possible and are similarly entered into the keyboard. For example, a jump from 9 to 18 to 25, is accomplished by pressing 9 TO 1 8 TO 2 5 and ENTER.

You can also check out the other move possibilities for any particular move by pressing the CLEAR key, which has the effect of calling the computer's last move back for redetermination. When

you then press ENter, the computer exhibits its countermove, which may be the same countermove, or possibly a different one. You can also see how the computer reacts at different levels of play.

There are two other play modes, position verification and problem mode. In the position verification mode, you can ask the computer to inform you of the exact position of each of its pieces on the board during the course of a game. In the problem mode, you can play certain checker problems and special move situations.

BACKGAMMON CHALLENGER

This computerized backgammon game (Fig. 3-40), from Fidelity Electronics, is designed and programmed to play precisely according to the rules of backgammon. Red's area of the game board, home board and outer board, are numbered 13 to 24. The number 0 is the bar point, and 25 represents the bear-off point. The computer identifies a move by displaying FROM a given point TO another numbered point, for example, a move from point 12 to 16 will appear in the display as 12 16.

There are three dice roll options. You can roll for yourself, and the computer or the computer can roll for you and itself. The dice roll mode is selected by pressing the GM key (Fig. 3-41). The roll of the dice is computer controlled. The computer randomly selects two numbers, each representing a pip from a die. The display will read 2 5 when you "roll" a 2 and a 5. When "play" is displayed in the window, you move your men 2 points and 5 points. If, for example, you want to move your man from point 9 to point 14, press 0, 9, 1,

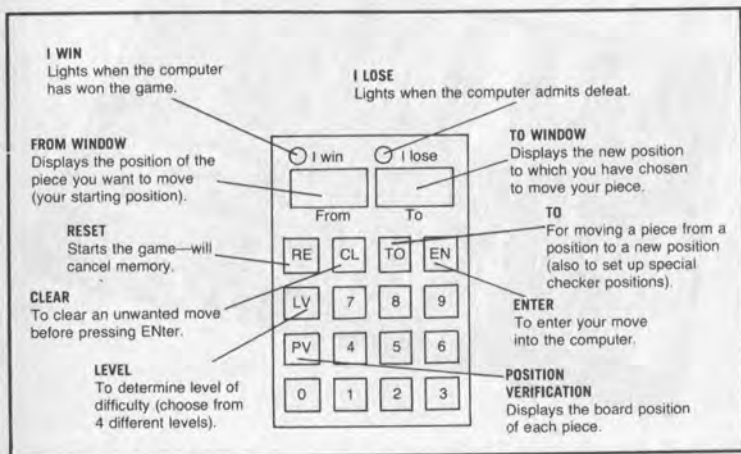


Fig. 3-39. Keyboard controls of Checker Challenger from Fidelity Electronics.

and 4 in succession. To return a man from the bar point (which is 0), the move is entered as from 00, such as 00 03. To bear off, the TO location is 25, for example, 22, 25.

This computerized backgammon game allows you to use the doubling cube to increase the stakes when it is your turn to roll the dice, verify your position and that of the computer's, and use the problem mode. The game has been programmed with a test program to verify correct operation of the game. Press each key in succession as shown in Fig. 3-42 and check that the correct readout is displayed.

OMAR BACKGAMMON

Omar (Fig. 3-43), from Tryom Inc., includes all backgammon strategies running game, block hit and run, semiback game, back game, blot-hitting contest, bear-off game, and doubling cube strategies. Enclosed with the Omar game is a set of numbers 1 through 12, inclusive. Place these numbers on your own backgammon set with the number 1 placed on the far right of the board and then set it up as shown in Fig. 3-44. You will always play X, moving your men counterclockwise around the board. Omar will always play O. Visualize the board as divided into two halves, an upper half with points numbered 1 through 12 and a lower half with points 12 through 1.



Fig. 3-40. Backgammon Challenger computerized backgammon game (courtesy Fidelity Electronics).

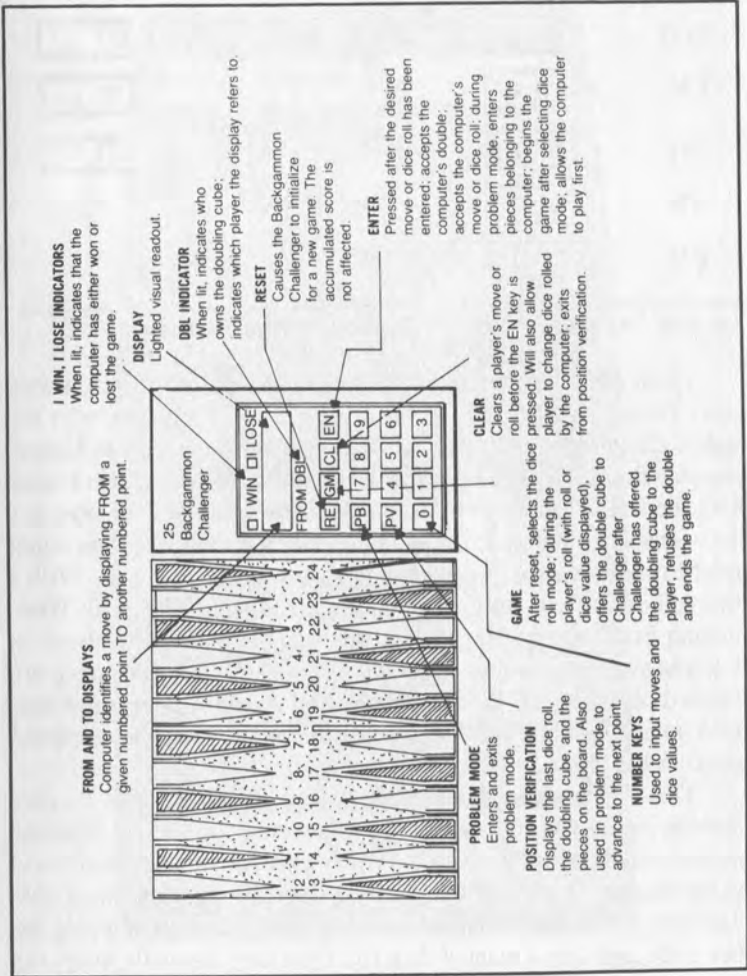


Fig. 3-41. Board layout and key-board controls of Backgammon Challenger from Fidelity Electronics.

Keys	Display	Keys	Display
RE	ro II	EN	ro II
GM	DI:CE	1,2	12
GM	DI:CE	EN	PLAY
EN	ro II	0, 1, 0, 2	01 02
EN	ro II	EN	2
6, 6	66	0, 1, 0, 3	01 03
EN	13 07	EN	do ub
EN	13 07	GM	01 00
EN	24 18	"I WIN" Indicator lit	
EN	24 18		

Fig. 3-42. Test program setup for Challenger backgammon game.

Omar follows the rules of the American Backgammon Association. To begin, each player throws one die. The player with the higher die goes first. If the right-hand die on the display is higher, you play first; if the left-hand die is higher, Omar plays first. Figure 3-45 shows the keyboard controls. You move your men by pressing the appropriate buttons; for example, when moving from an upper point to another upper point, you push the upper arrow Δ . With a dice roll of 6-3, you press the sequence shown in Fig. 3-46. When moving from an upper point to a lower point, with a dice throw of 3-4, you press the sequence shown in Fig. 3-47. When bearing off, with a dice throw of 6-3, for example, and you wish to bear one man from point 6 and one man from point 3, you press as the sequence given in Fig. 3-48.

This computerized backgammon game allows you to play doubles (when you roll doubles you may enter up to four separate moves), verify board position (to verify exact position of every man on the playing board), display and use the doubling cube (to double your opponent when it is his or her turn to play, before stopping the dice roll), and use a manual dice roll (you may manually enter the

dice roll for yourself and the computer instead of using the automatic random dice roller).

CHARLES GOREN BRIDGEMASTER

This computerized bridge game from Tryom Inc. is competitive to the average bridge player. Bridgemaster (Fig. 3-49) plays contract bridge, utilizing the Goren point count system and the standard American style of play. The unit is self-contained and allows you to make a variety of plays. You can play against three computer players, you and your partner can challenge two computer



Fig. 3-43. Omar computerized backgammon game (courtesy Tryom Inc.).

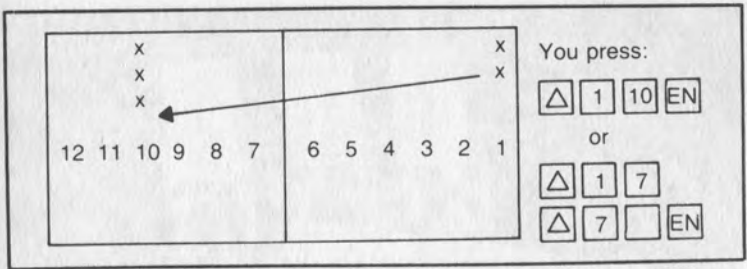


Fig. 3-46. Moving from an upper point to another upper point in Omar backgammon game.

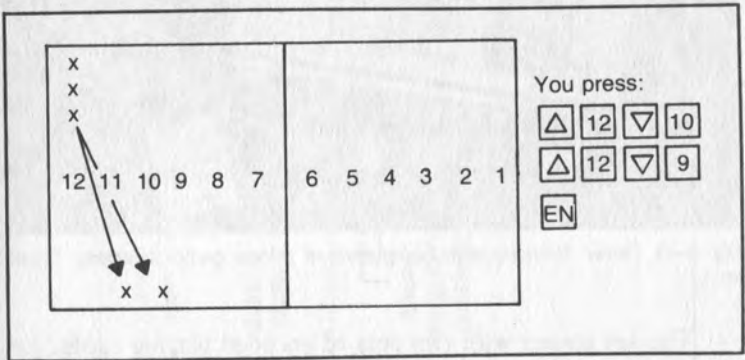


Fig. 3-47. Moving from an upper point to a lower point in Omar backgammon game.

players, or three human players can play against the computer. At the beginning of the play, the computer assumes that all players are human, and by using the built-in keyboard (Fig. 3-50), you can tell the computer which sides it should play, North, South, East, or West.

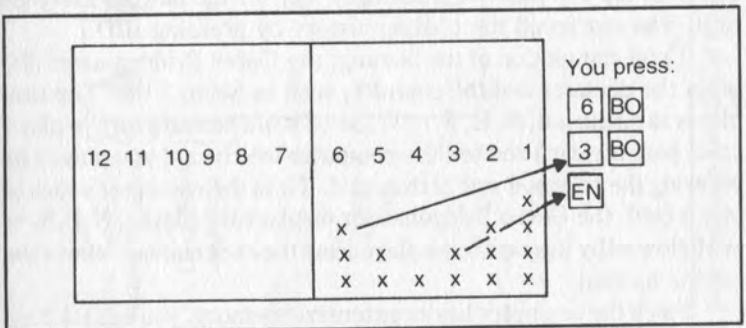


Fig. 3-48. Bearing off in Omar backgammon game.



Fig. 3-49. Goren Bridgemaster computerized bridge game (courtesy Tryom Inc.).

The set comes with two sets of encoded playing cards, and after the hand is dealt, you code the cards by putting them through an optic card scanner. The computer follows a programmed sequence, and after the scanning has taken place, it asks who the dealer is. You can also set the vulnerability.

The dealer must begin the bidding. The computer asks, "Bid North? South? East? West?" If North is the dealer, the display reads, "Bid North?" Bids are keyed in; for example, if you want to bid one heart, press the 1♥ and the heart keys. Based on the cards scanned, the computer automatically bids for the players assigned to it. You can recall the bidding history by pressing BID.

Upon completion of the bidding, the Goren Bridgemaster displays the declarer and the contract, such as South 2 HT. The first player is displayed, N, E, S, or W, and if it is a human's turn to play a card, play the card and tell the computer which card you played by entering the rank and suit of that card. If it is the computer's turn to play a card, the Goren Bridgemaster displays the player, N, E, S, or W, followed by the card to be played and the rack number where the card is located.

Since the computer has an extensive memory, you can ask for a trick display/replay or replay the hand in its entirety. The pro-

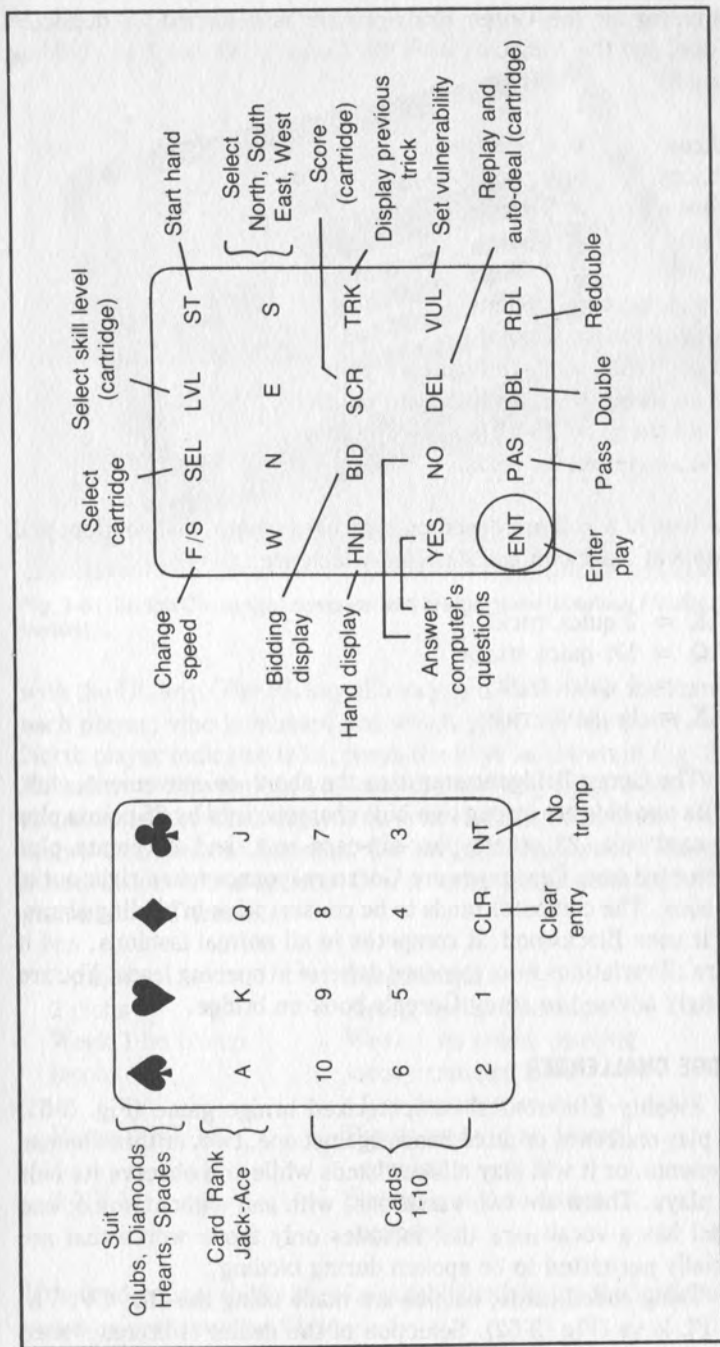


Fig. 3-50. Keyboard functions of the Goren Bridgemaster.

gramming for the Goren Bridgemaster is designed for duplicate bridge, and the computer uses the Goren point count and bidding system:

Aces	= 4 points
Kings	= 3 points
Queens	= 2 points
Jacks	= 1 point
Void	= 3 points
Singleton	= 2 points
Doubleton	= 1 point
1 no trump	= 16-18 high card points
2 no trump	= 22-24 high card points
3 no trump	= 25-27 high card points (no singletons or voids)

One bid of a suit are based on high card points, distribution, and contain at least two quick tricks, which are:

AK	= 2 quick tricks
AQ	= 1½ quick tricks
A	= 1 quick trick
KX	= ½ quick trick

The Goren Bridgemaster uses the short, or convenient, club, and its two bids are strong two-bids characterized by 25 points plus five-card suit, 23 points plus six-card suit, and 21 points plus seven-card suit. Responses are Goren responses taken right out of the book. The computer tends to be conservative in bidding slams, and it uses Blackwood. It competes in all normal fashions, and it offers all variations from standard defense in opening leads. You are strongly advised to study Goren's book on bridge.

BRIDGE CHALLENGER

Fidelity Electronics' computerized bridge game (Fig. 3-51) will play one, two, or three hands against one, two, or three human opponents, or it will play all four hands while you observe its bids and plays. There are two variations, with and without voice; one model has a vocabulary that includes only those words that are officially permitted to be spoken during bidding.

Using coded cards, entries are made using the DL, CV, VL, and PL keys (Fig. 3-52). Selection of the dealer is accomplished



Fig. 3-51. Bridge Challenger computerized bridge game (courtesy Fidelity Electronics).

with the DL key. The PL key allows you to determine the status of each player; who is human, and which plays the computer. If the North player indicator is lit, press the keys as shown in Fig. 3-53. To select a convention, you use the CV key (Fig. 3-54). When appropriate, the Challenger always uses three of the more widely known conventions: Stayman, Gerber, and Blackwood. There are six other convention options. One or more can be selected for each partnership. These are:

5 major
2 clubs
Weak 1 no trump
Jacoby

Baron 2 NT-13

2 NT-11

5-card majors
Strong 2-club opening
Weak 1 no trump opening
Jacoby transfer after
1 no trump opening
Baron reply to no trump
opening
Strength of 2 no trump
response

If desired, vulnerability may be established during the initial entry stage by pressing the VL key.

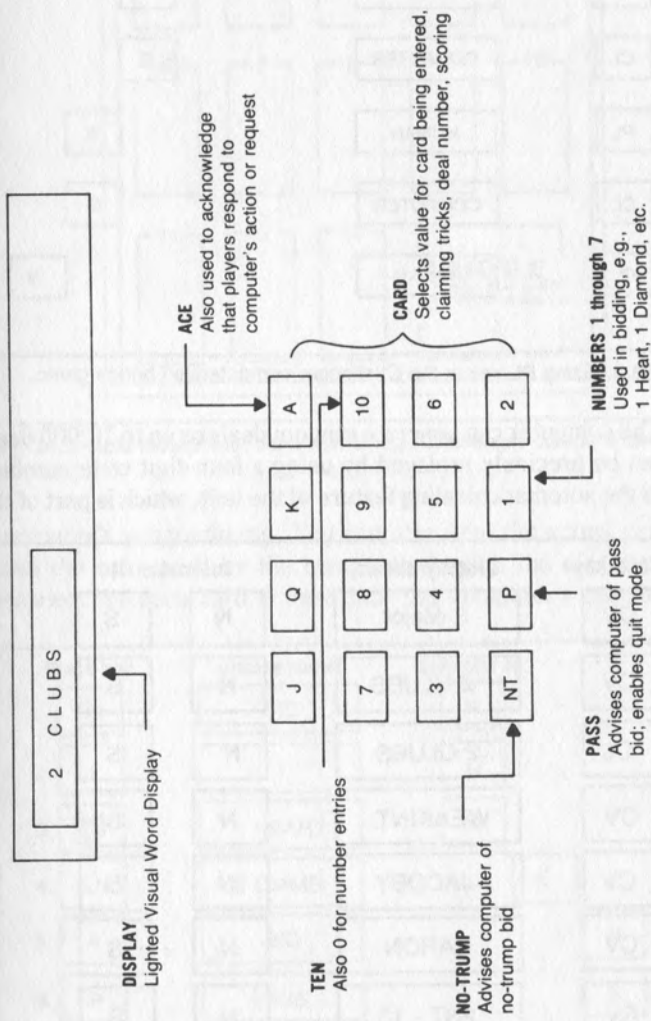


Fig. 3-52. Keyboard functions for Challenger bridge game.

Press key	Display shows	Indicator lit
1. PL	HUMAN	N
2. PL	HUMAN	E
3. CL	COMPUTER	E
4. PL	HUMAN	S
5. CL	COMPUTER	S
6. PL	HUMAN	W

Fig. 3-53. Utilizing PL key in the Challenger computerized bridge game.

The computer can generate random deals or up to 10,000 deals that can be precisely replayed by using a four-digit code number. This is the automatic dealing feature of the unit, which is part of the

Press key	Display shows	Indicator lit
1. CV	S-Major	N S
2. CV	2 CLUBS	N S
3. CL	2 CLUBS	N S
4. CV	WEAKINT	N S
5. CV	JACOBY	N S
6. CV	BARON	N S
7. CV	2NT - 13	N S
8. CV	S-MAJOR	E W

Fig. 3-54. Use of CV (convention) key with Bridge Challenger computerized bridge game.

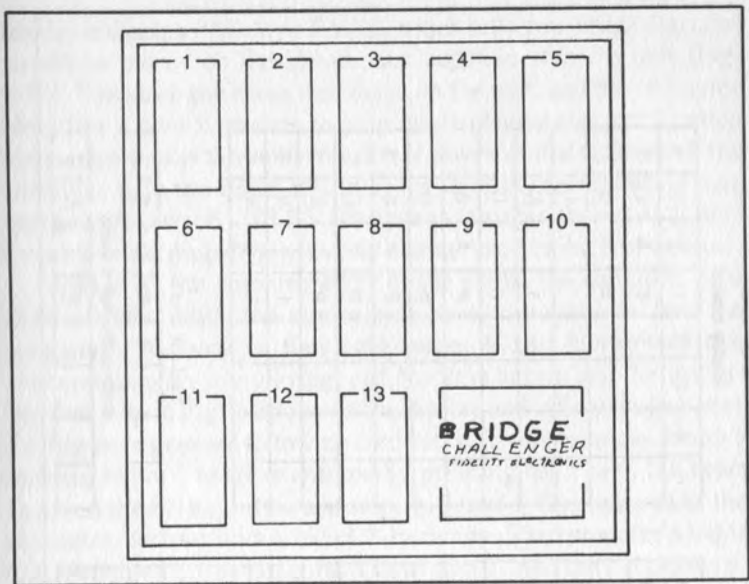


Fig. 3-55. Card locator mat used with Bridge Challenger computerized bridge game.

computer's programming. You can also deal the actual cards and pass the ones used by the computer through the electronic card scanner. As each card is read into the computer's memory, the

	Press key	Display shows	Indicator lit
1.	EN	BID	N
2.	I	1	N
3.	♥	1 HEART	N
4.	EN	2 DIAMS	E
5.	A	BID	S
6.	P	PASS	S
7.	EN	PASS	W
8.	A	BID	N

Fig. 3-56. Sample of bidding sequence of Bridge Challenger.

Item key	Indicator							Display readout							
	N	E	S	W	V	V	RD	F	I	D	E	L	I	T	Y
1. RE	•	•	•	•	•	•	•								
2. EN	•				•	•	•				D	E	A	L	?
3. EN	•												B	I	D
4. 1	•													1	
5. NT	•											1		N	T
6. EN		•											B	I	D
7. P		•											P	A	S
8. EN						•							B	I	D
9. P					•								P	A	S
10. EN						•							B	I	D
11. P							•						P	A	S
12. EN		•											1		N
13. A													L	E	A
14. scan a card		•													
15. EN						•									
16. scan 13 cards						•									
17. EN						•									

card suit and value

each card—suit & value

Fig. 3-57. Test program of Bridge Challenger computerized bridge game.

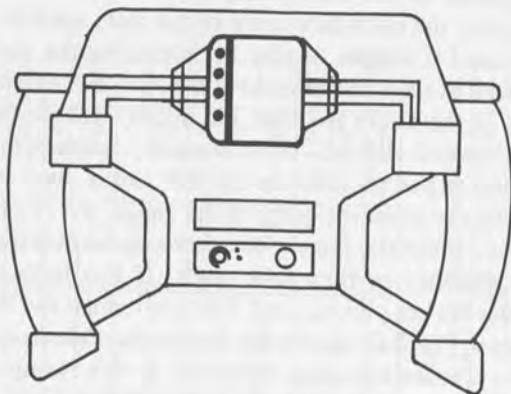
display indicates PAD 1, or PAD 2, which tells you where that card should be placed on the locator mat supplied with the unit (Fig. 3-55). You place the cards face down on the mat, and the computer identifies a card it wishes to play by displaying the pad location number as well as the suit and value of the card. For example, if the computer is in the South position, the display and indicators may appear as follows: 6 - HE 5 S. This means that South wishes to play the card found on pad position six and the card is the 5 of hearts.

Based on the scanning entry of the cards, the computer bids automatically, while the human bids have to be entered into the computer's memory as they take place. If two human and two computer players are playing, and North is human and the dealer, the first step in Fig. 3-56 shows the display and indicators just after EN has been pressed following card entry. In this example, North's opening bid of 1 heart is entered by pressing the 1 key, the heart key, and the EN key, shown in steps 2, 3, and 4. East, played by the computer, follows with a bid of 2 diamonds. The computer's bid is acknowledged by pressing the A key (step 5), and the bid passes to South. A human playing South, passes by pressing the P key (step 6), and enters the pass bid by pressing the EN key in step 7. West, played by the computer, also passes, and the computer's bid is acknowledged by pressing the A key in step 8. When the bidding is completed, the final contract is displayed, and the declarer's indicator is lit. Play begins when the A key is pressed.

The actual playing of each hand is the same as with four humans. Cards played by the computer are acknowledged by pressing the A key, while cards played by the humans are entered via the scanner and registered by pressing the EN key.

The computer has been programmed to replay a deal as many times as you wish. The use of the PB key allows you to change player status and allows a human to take over one of the computer's hands. The computer also has the ability to play out a deal automatically and display the results if all hands are known to the computer. During the bidding sequence, the BR key causes display of all bids entered to that point. A test program allows you to completely test the operating sequences of the computer (Fig. 3-57).

Chapter 4



Road Games

There are a number of varieties in this kind of computer-controlled game from a "dashboard game" to "road racing." In most cases the object is to beat the computer, which is often represented by an automobile-shaped image.

REDLINE

Here, you use a replica of a dashboard and try to control the engine and win the race without jumping the start signal, as in real drag racing, or exceeding the redline safe limit for engine speed. The computer provides the thrills, sounds, and excitement of real drag racing. You can choose from four classes of competition: Stock Class rated at 6999 RPMs, Modified Class at 8999 RPM, Funny Car Class at 9999 RPM, and Top Fueler Class at 8999 RPM. With a special cable, two Redline games can be hooked together, allowing one dragster to compete with another.

If you start too soon, you are disqualified, and if you rev your engine too fast, you "blow" it. Kenner Electronics' digital console (Fig. 4-1), which you hold in your hand, is designed like a dragster steering wheel. It contains the "Christmas tree" lights, an electronic readout of the gear numbers, and the RPMs (revolutions per minute) of your engine (Fig. 4-2). With the "gear" and "gas" button, you control your dragster. The engine idles, and you test the engine's performance by revving it up. The staging lights come on, moving in sequence down toward the green start light. You watch

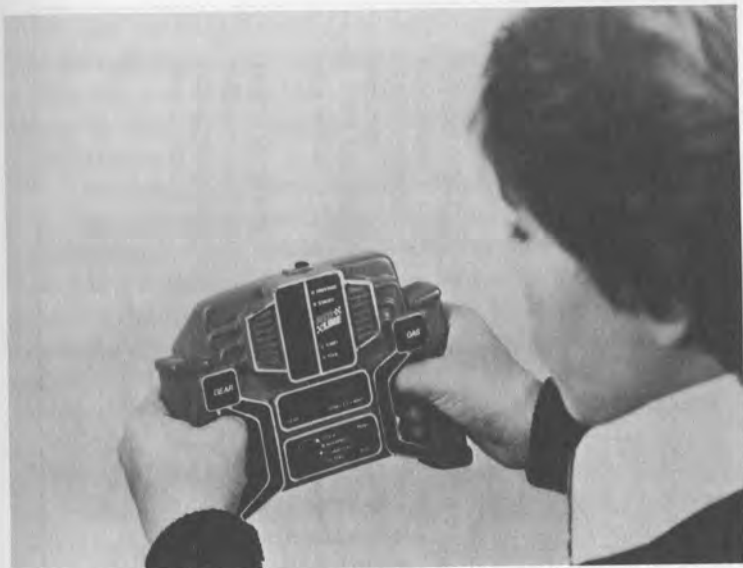


Fig. 4-1. Redline electronic drag race (courtesy Kenner Electronics).

intently, because you cannot start until that green light has come on. There it is—green! You shift into first gear, accelerate, tires screech, and you quickly shift into second gear, accelerate, and shift gears! You cross the finish line, and the elapsed time of the run is given, followed by the miles per hour achieved.

RACEWAY/AUTORACE

Raceway, by Tiger Electronics, has a real steering wheel and a throttle control. You have to complete four laps around the track within 99 time intervals. You also have to steer your car around other traffic in order to avoid collisions, because a collision bumps your car back one space.

Mattel's autorace has a similar object. In this game, you are driving on a track and must cover four laps in as short a period as possible. The built-in computer sends vehicles into the driving lane you are using. When a collision occurs, your car is set back one space. If you don't move your car from its lane immediately after a collision, the other car, controlled by the computer, continues to push you backward.

CHAMPION RACER

Champion Racer, by Bandai America, is a game of high speed

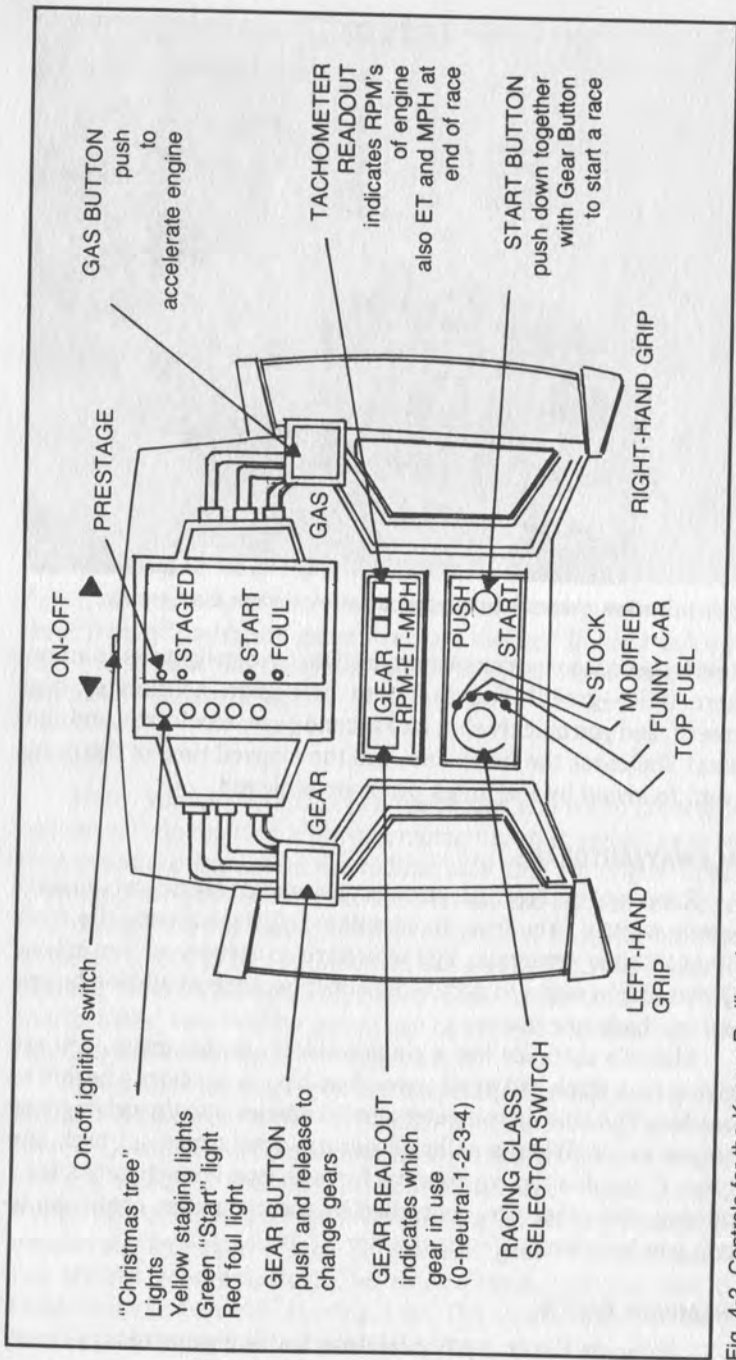


Fig. 4-2. Controls for the Kenner Redline drag race.

thrills and roadway action as you test your driving skills to score high mileage points. You are allowed 100 seconds as you shift gears, accelerate, and change lanes while increasing your speed. Each time you collide, a crash sound is emitted, and your car returns to the start area.

The controls for this game are shown in Fig. 4-3.

You move your car out of the pit and into traffic. Escape crashes by operating steering buttons to go left or right or from lane to lane. There is a running sound that varies as you increase or decrease speed. A "piro—piro—piro" crashing sound is emitted when you crash, but you have to avoid crashes, because not only do they reduce your operating time by 2 seconds, but your car is also returned to the pit stop, and you have to start all over again.

SLIMLINE SPEEDWAY

Slimline Speedway, by Tomytronic, is a game that fits in your pocket, making it handy to take with you on trips. There are five games: Practice Racing, Circuit Racing, Dodge Racing, Car Chase, and Head On (Fig. 4-4). Absolute concentration and very fast reaction are required for the last three games. In each race, you have to press the acceleration button to drive your car faster and the brake button to slow it down. Your car has four speeds; each time you press the acceleration button, it goes to the next faster speed. The

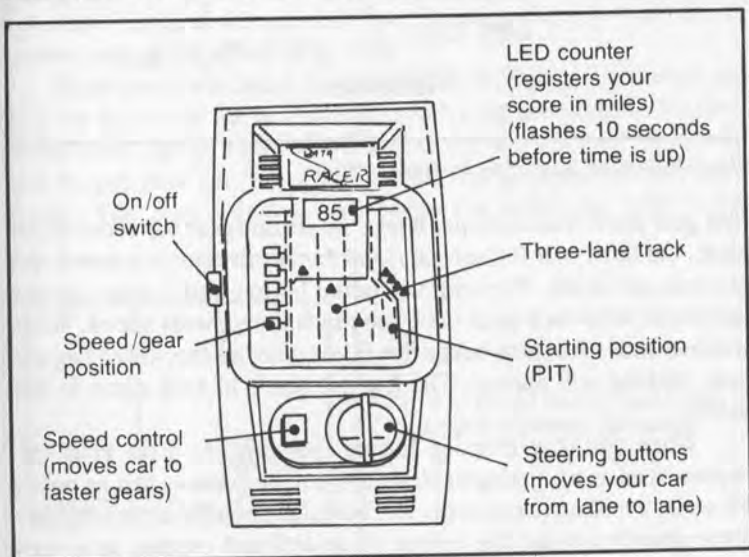


Fig. 4-3. Controls of Champion Racer, by Bandai America.

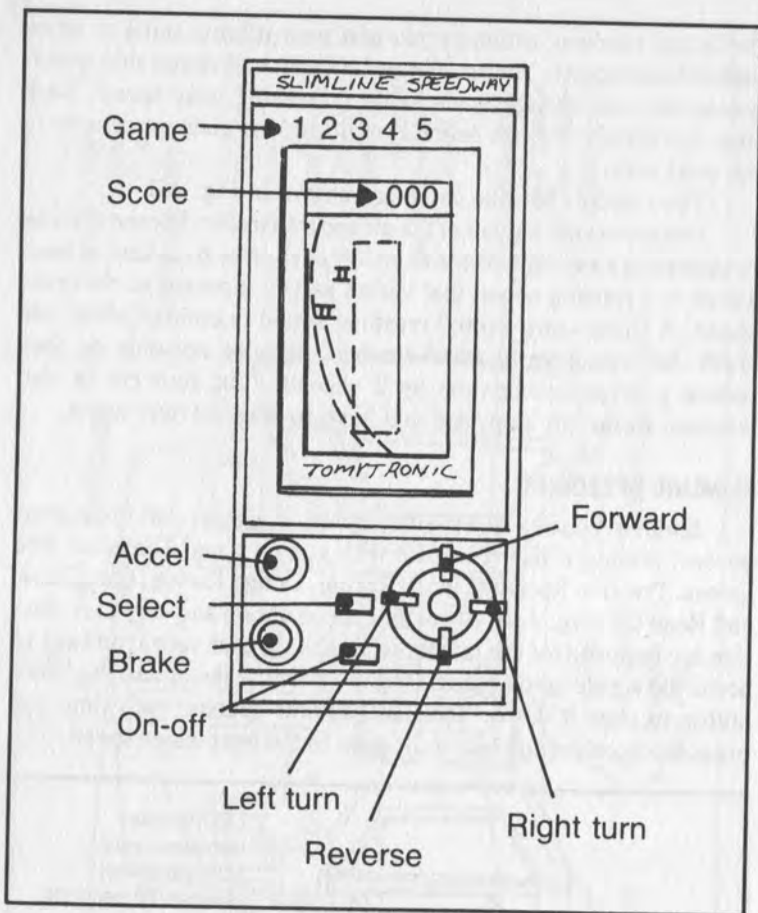


Fig. 4-4. Slimline Speedway by Tomytronic.

first gear has 0.4 seconds per blink, the second gear 0.3 seconds per blink, the third gear 0.2 seconds, and the fourth gear, top speed, 0.1 seconds per blink. Pressing the brake button slows your car one increment with each push until you reach the slowest speed. When the race ends, the game beeps five times, and the checkered flag and your ranking will appear. The highest score in each game is 999 points.

When you play Practice Racing, you have to drive your car, represented as a blinking vehicle, around the track as fast as possible while avoiding the jam car. The built-in computer steers the cars automatically around the course (Fig. 4-5) and creates an erratic course for the jam car. You never know what the jam car is going to

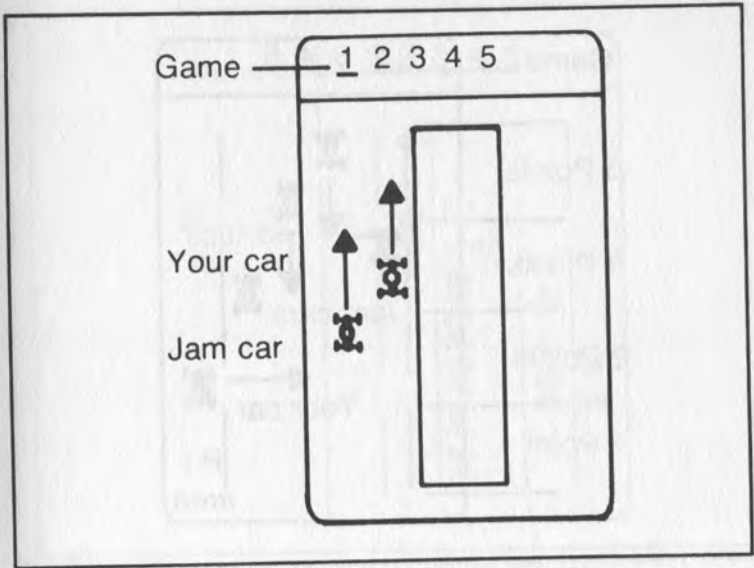


Fig. 4-5. Practice Racing game from Tomytronic's Slimline Speedway.

do next, and only fast reflexes will prevent you from hitting the jam car or the fence.

In Circuit Racing, you face the same problems as in Practice Racing, but now you have to steer the car yourself by pressing the right-turn button at the correct time. Pressing the left-turn button causes your car to crash (Fig. 4-6).

When you start Dodge Racing (Fig. 4-7), the jam cars come up from the bottom of the screen until you hit the acceleration button. At that time, the cars approach from the top of the screen. Now you have to get your car out of the pit area by pressing the left-turn button. The only way you can dodge the oncoming cars is by

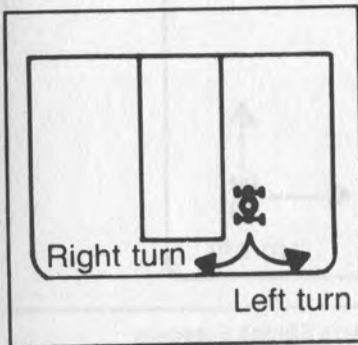


Fig. 4-6. Circuit Racing game from Tomytronic's Slimline Speedway.

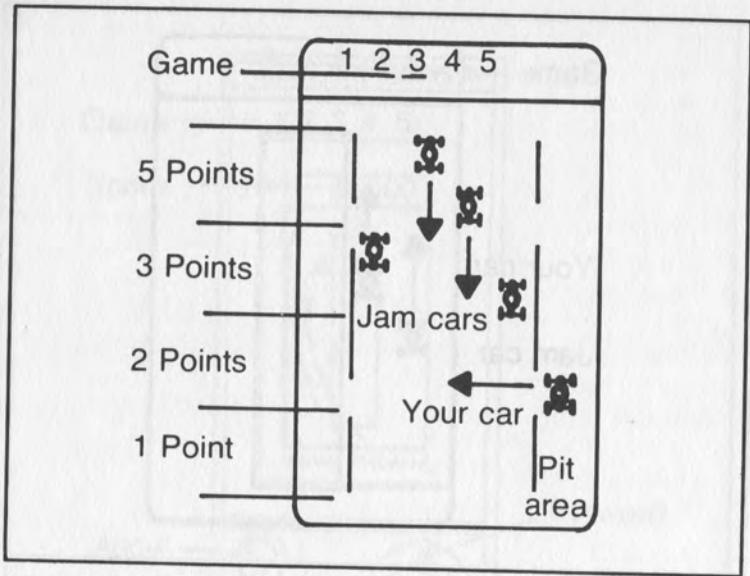


Fig. 4-7. Dodge Racing game from Tomytronic's Slimline Speedway.

changing lanes. At the same time, you have to score points by moving your car closer to the top of the screen, by pressing the forward button.

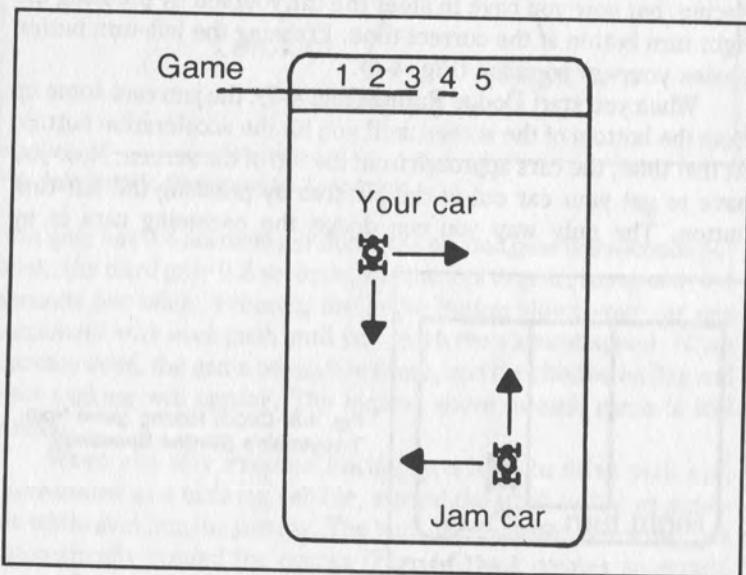


Fig. 4-8. Car Chase game from Tomytronic's Slimline Speedway.

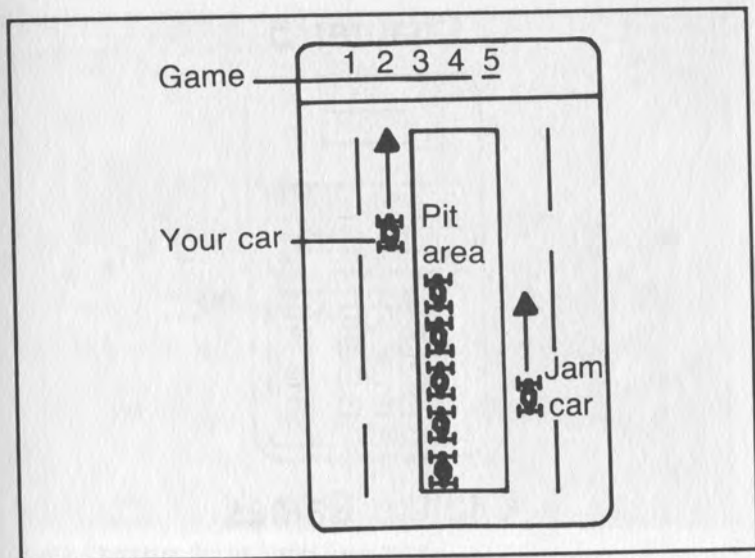
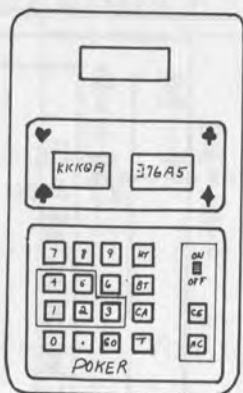


Fig. 4-9. Head On game of Tomytronic's Slimline Speedway.

You want more action! In Car Chase (Fig. 4-8) you have to hit the jam car as many times as possible in 2 minutes. Although your car and the jam car both run at a fixed speed, the jam car moves at random. If you run into the wall, you have to start all over.

In Head On (Fig. 4-9) you have six cars at your disposal. You have to accelerate, brake, and make left and right turns, while avoiding the jam car. Your car runs clockwise, and the jam car runs counterclockwise. You not only have to avoid the jam car, but a wrong move can send you into a wall, and you'll lose one of your cars. Try to score 999 points.

Chapter 5



Chance Games

A number of manufacturers offer a variety of gambling, or chance, games that simulate real life situations. Whether it's poker, gin or blackjack, you can try "your hand" at beating a computer.

COMPUTER GIN

Computer Gin (Fig. 5-1), by Mattel Electronics, allows you to play four different games: Gin 1, Gin 2, Go Draw, and 33 (the difference between Gin 1 and Gin 2 is the level of difficulty—in Gin 2, you play against a "tougher" computer). All four games are played with a full deck of 52 cards that read out on the screen in red and black.

The object of Gin is to collect a hand of 10 cards arranged in runs and sets, with an eleventh card that must be discarded (thrown down at the end of a turn). A run is a consecutive series of three or more cards of the same suit, such as diamonds, 3, 4, 5, and 6. A set is three or four cards of the same kind, such as 5 of spades, 5 of hearts, 5 of diamonds, and 5 of clubs, or 7 of spades, 7 of diamonds, and 7 of clubs. A card that forms the intersection of a run and a set can only be counted once. If it is used as part of the run, you must have three or more cards to form the set (Fig. 5-2).

The controls (Fig. 5-3) are DRAW, SELECT, DISCARD, DEAL, COMP, and SCORE.

Press the deal/gin button and the computer deals you 10 cards that appear face up on the screen. An eleventh card is dealt that



Fig. 5-1. Computer Gin by Mattel Electronics.

flashes continuously. When it is your turn, you must either pick up this flashing card or draw a new one from the deck. If you want to keep the new card, you must discard one card from your hand. In the case of the situation illustrated in Fig. 5-4, it is useful to keep the flashing card and discard the 2 of diamonds. Press the select button until the 2 of diamonds flashes on the screen. Now, press DISCARD, and another card appears on the screen.

Now, it's the computer's turn. It can also pick up a flashing card or draw one from the deck. If it wants your discard, it says THANKS. If it doesn't want your card, NO THANKS appears on the screen, and the computer draws a card from the deck. If it keeps the card, it indicates this by displaying an asterisk. In either case, the computer's discard will be flashing (Fig. 5-5).

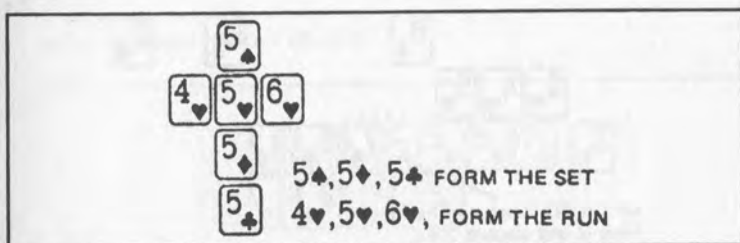


Fig. 5-2. In the sample shown you can choose to have 5 of hearts, 5 of diamonds, and 5 of clubs to form the set, and 4 of hearts, 5 of hearts, and 6 of hearts to form the run.

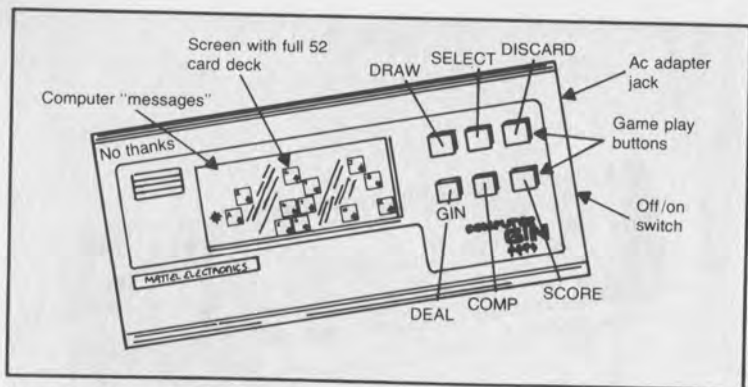


Fig. 5-3. Computer Gin controls.

Continue to play the game alternating turns with the computer. If you think you have GIN on your turn, press deal/gin button. If you have gin, the word GIN appears on the screen and you've won. If you press DEAL/GIN, and you don't have gin, the words NO GIN appears. If the computer gets gin on its turn, the word GIN appears with an asterisk. Figures 5-6 and 5-7 illustrate the gin and no gin situations.

When you press COMP, you can compare your final hand with that of the computer's. When you press SCORE, a row of cards (Fig. 5-8) is displayed, showing how many games you have won, and how many games the computer has won. For every game the computer wins, a card appears in the diamond row, starting with the ace of diamonds. Your game scoring starts with the ace of spades.

The object of the Go Draw game is to collect more sets of four of a kind than the computer, by taking cards from the computer's hand or drawing cards from the deck. The game ends when you or the computer have all cards laid down in sets.

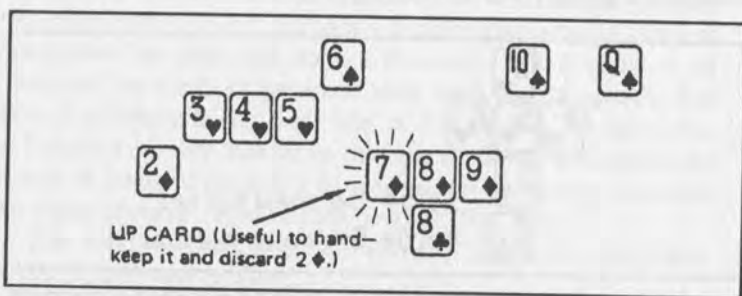


Fig. 5-4. Sample of your first play. The 7 of diamonds is flashing. With this hand, you want to take the 7 and discard the 2 of diamonds.

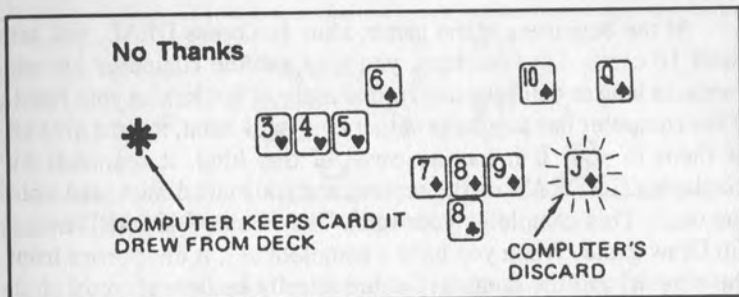


Fig. 5-5. Computer's turn of drawing cards.

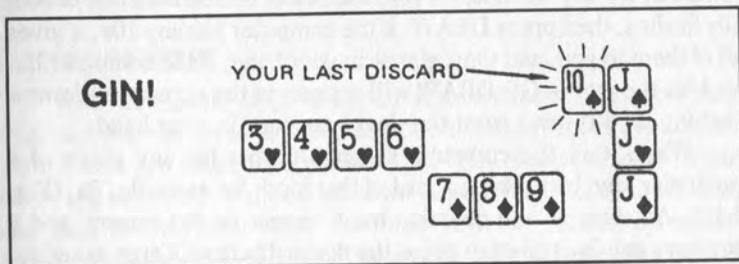


Fig. 5-6. Typical situation when you have GIN.

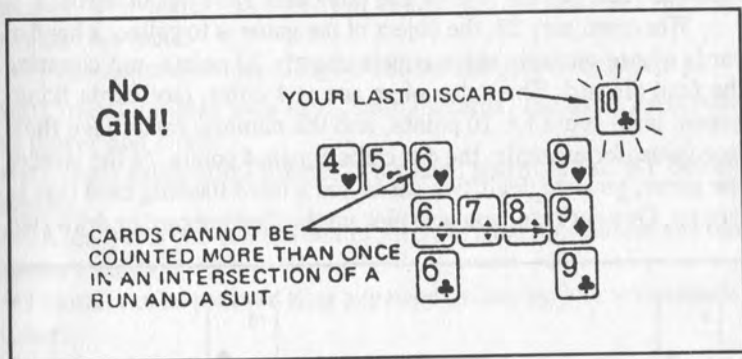


Fig. 5-7. A typical NO GIN situation.



Fig. 5-8. The scoreboard. You have won seven games, and the computer five.

At the beginning of the game, after you press DEAL, you are dealt 10 cards. On your turn, you may ask the computer for any cards, as long as you have one card or more of that kind in your hand. If the computer has any cards of that kind in its hand, it must give all of them to you. If it has no cards of that kind, it responds by displaying GO DRAW on the screen, and you must draw a card from the deck. This completes your turn. There is no DISCARD in the Go Draw game. When you have a complete set, it disappears from the screen, and the computer automatically records it.

In a situation as shown in Fig. 5-9, you may want to ask the computer for any 10s it has. Press the select button until one of your 10s flashes, then press DRAW. If the computer has any 10s, it gives all of them to you, and they appear in your hand. If the computer has no 10s, the words GO DRAW will appear on the screen, and a new flashing card (drawn from the deck) appears in your hand.

When it is the computer's turn, it asks for any cards of a particular kind by flashing a card of that kind, for example, 3s, (Fig. 5-10). An asterisk and question mark appear on the screen, and if you have any 3s, you must press the discard button. Cards asked for disappear, and the word THANKS appears on the screen. The game continues until either you or the computer runs out of cards.

When you play 33, the object of the game is to collect a hand of cards whose numeric value equals exactly 33 points, not counting the final discard. The value of an ace is 1 point, face cards (king, queen, jack) count for 10 points, and the numeric cards have their face value; for example, the 4 of clubs equals 4 points. At the start of the game, you are dealt two cards and a third flashing card that is face up. On your turn, you may pick up the flashing card or draw two

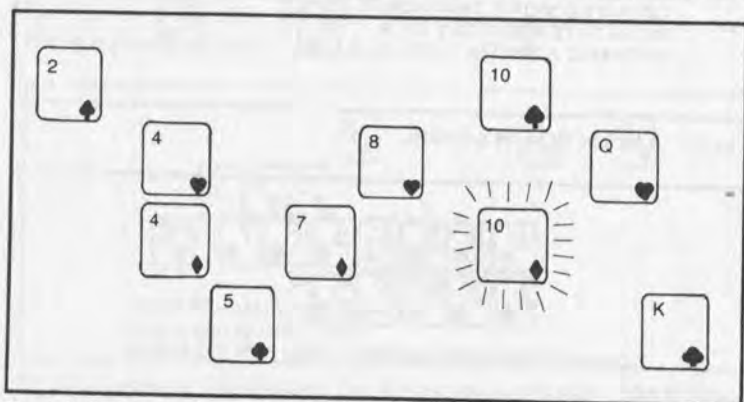


Fig. 5-9. In this situation, you may want to ask the computer for a 10.

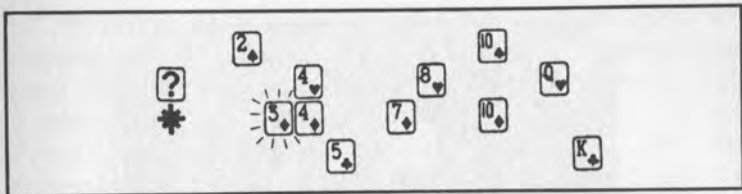


Fig. 5-10. Computer's turn in Go Draw game.

cards from the deck. At the end of your turn, you must discard one card from your hand. The computer follows the same procedure. A typical win situation is shown in Fig. 5-11.

ELECTRONIC POKER

With this game (Fig. 5-12) by Entex Electronics, you play five-card draw poker against the computer, which acts as the dealer. Both hands are dealt face down on an LED digital display. Your cards are revealed, and you can draw new cards if so desired. You can then bet or fold. After the first bet, two dealer cards are revealed, and you can call or bet again. Then, another dealer card is revealed. You can bet again, or call, and the computer shows the winner. The dealer can bluff you, double you, or fold, and you will not see his hand.

The control buttons (Fig. 5-13) on this game represent:

- DL (deal) initiates each hand, shuffles cards, and deals five cards to player and dealer.
- BT (bet) automatically antes 1 for each player. Push BT before betting.
- CA (call) lets you call the dealer, end the hand, or fold and see the dealer's cards.
- T (total) can be pressed after any hand to display your winnings or losses.

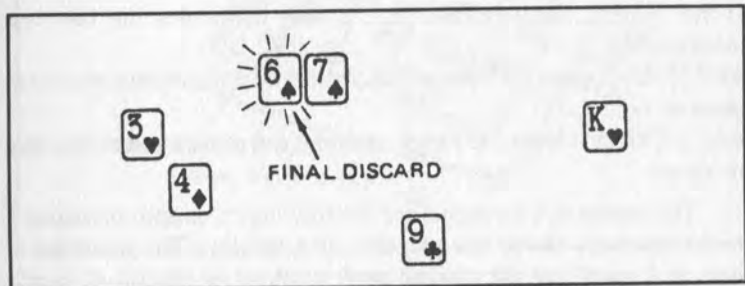


Fig. 5-11. A typical win situation in 33.



Fig. 5-12. Electronic Poker game by Entex Electronics (courtesy Entex Electronics).

- GO completes any action in the machine and turns the action over to the dealer. When pushed after a bet, it doubles the last bet automatically.
- CE (correct entry) allows you to correct mistakes when you draw cards or bet.
- AC (all clear) clears the entire machine and erases your winnings or losses.

The numbers 1 through 5 are for drawing cards and correspond to the numbers above the player's card display. The numbers 1 through 9 and 0 are for placing bets.

To play poker, push the DL button. Cards are shuffled in both displays, and five cards each are dealt face down to the dealer and you. Then, your hand is turned face up. (Note: The 0 card is a 10.) Draw any number of new cards from one to five if you so desire. Push GO and your new cards are shown. Some of the dealer's cards will blink, indicating the dealer's draw. If your hand is a good one, push BT and an automatic ante of 1 is shown. You can place a minimum bet of 1, up to a maximum of 9999. Push GO. If your hand is weak, push CA.

When you have made your first bet, the dealer can fold, and his display will show 0, and you win. The dealer can match your bet, and his first two cards will turn face up or double your bet, which you must match in order to stay in the game. If the dealer doubles the bet, his first two cards are turned up, and it is time for you to fold, match, or increase your bet. If you decide to match or increase the bet, push BT and enter any bet from 1 to 9999.

Push GO and the third dealer card will show up. Make your third, and final, bet as described above. Push GO and the total winning bet appears in the window. The winner's hand blinks. Push T to check your winnings. It's a good thing that the dealer is only a computer; you'll soon find you owe the computer a lot of antes.

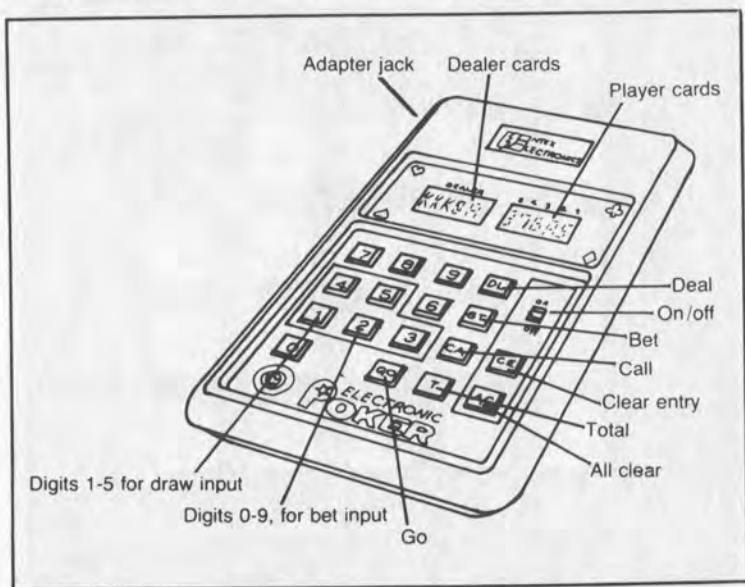


Fig. 5-13. Controls for Electronic Poker by Entex Electronics.

ELECTRONIC JACKPOT

Entex Electronic's Electronic Jackpot (Fig. 5-14) gives you a choice of Gin Rummy and Blackjack.

The object in Gin Rummy is to form a hand into matched sets:

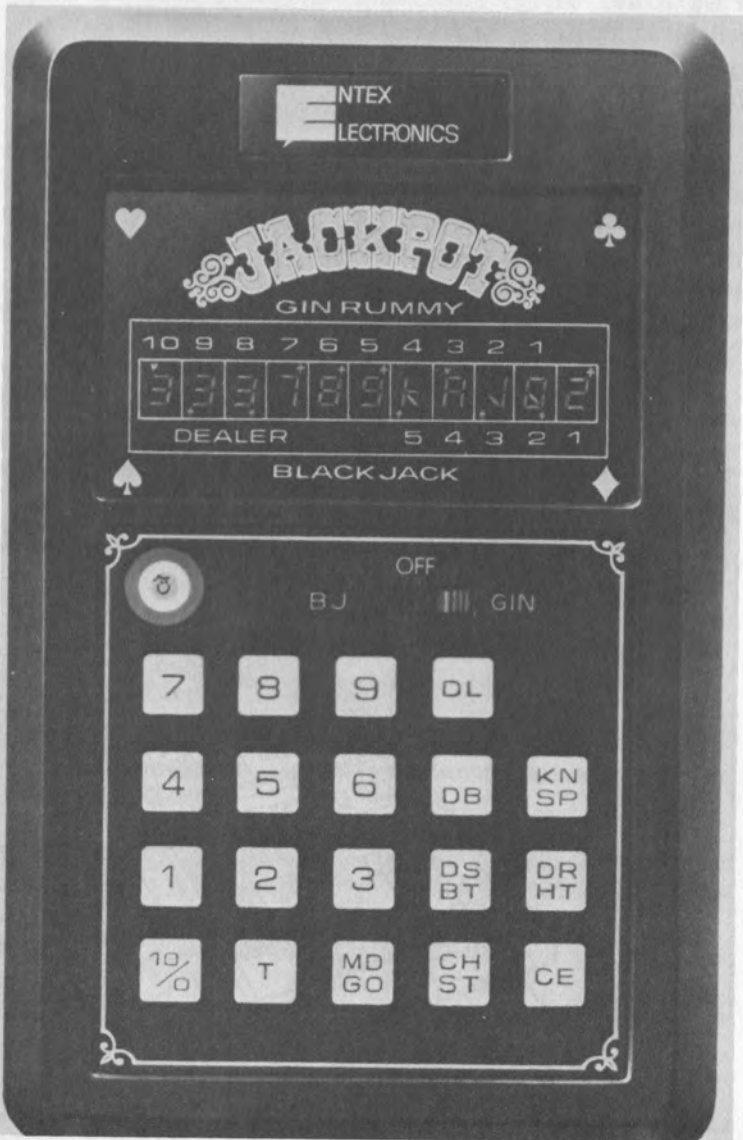


Fig. 5-14. Jackpot includes Gin Rummy and Blackjack (copyright © 1980 by Entex; reproduced courtesy Entex Electronics).

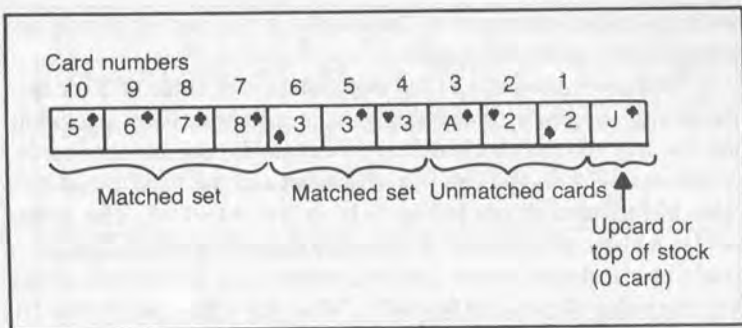


Fig. 5-15. Sample hand in Gin Rummy by Entex Electronics.

three or more cards in sequence in the same suit or three or four cards of the same value. Unmatched cards are those that do not form part of a matched set. After drawing, the dealer or player may “knock” if his or her unmatched cards (minus one discard) have a total value of 10 or less. The face cards count 10, an ace counts 1, and all other cards have a value corresponding to their numbers. The dealer or player “melds,” or lays down, his or her matched cards, discards one card, and lays down the unmatched cards. If the player or dealer knocks, and all ten cards are matched, then that player is said to “Go Gin.” The computer also automatically “lays off” any unmatched cards belonging to the knocker’s opponent that fit in the knocker’s matched sets.

The controls used in this game are DL for deal, DS for display, CH for change, DR for draw, KN for knock, MD for meld, CE for clear Entry, and T for total. A sample hand is shown in Fig. 5-15.

To see how a sample game goes, move the switch to GIN. Press the DL button. Cards are shuffled and dealt to players face down. The stock card is on the right. It is turned face up and, from this point on, will be the up card.

Press DS to turn your cards face up. Arrange cards in your hand by pressing the numbers above two cards, followed by CH. They will switch positions. This can be done repeatedly during your turn. If you want the up card, press the number above the card you want to discard and CH. If you don’t want the up card, press DR and the right-hand card will be replaced with the top card in the deck. If you want this card, press the number above the card you want to discard, followed by CH. Press CH alone, and the card you picked up, is discarded automatically.

After you end your turn by pressing CH, a number is shown, indicating how many turns you and the dealer have had. When you

reach 15 turns, the hand is considered a tie, and no points are rewarded to you or the dealer.

When your hand has a total unmatched card value of 10 or less (excluding one discard) or has all cards matched (Gin), excluding one discard, you can knock and lay down (meld) your matched cards, as shown in Fig. 5-16. The 9 is discarded and the total unmatched value of the hand shown in Fig. 5-16 is $3+2+1+1=7$. The dealer melds and lays off his cards. If the value was still greater than 10, it would be the dealer's turn, and you would have to continue trying until the value of cards fell below 10. When the value goes below 10, press KN; meld a set or discard, and press CH.

A GIN hand is shown in Fig. 5-17. Since the 10/0 button is used for both the number 10 card and the 0 card, you must be careful when melding to be sure to tell the computer what you want to do. There are two situations that may be slightly confusing. To meld the four 2s (Fig. 5-18), push KN - 10/0 - 9 - 8 - 10/0 - MD. The first time you press 10/0, it is read as 10; the second time as 0. In Fig. 5-19, the 10 card and 0 card are not in the same set, so pushing 10/0 twice will not work. In this case, you must meld the set with the number 10 card first, and then meld the set with the 0 card. As long as there is a card in position number 10, 10/0 will be read as 10. When no card is in the number 10 position 10/0 is read as 0.

Once CH is pressed, the dealer automatically melds any cards he can and lays off any cards onto your matched sets. The score is then shown on the display. The dealer's score is on the left side, and your score is on the right side.

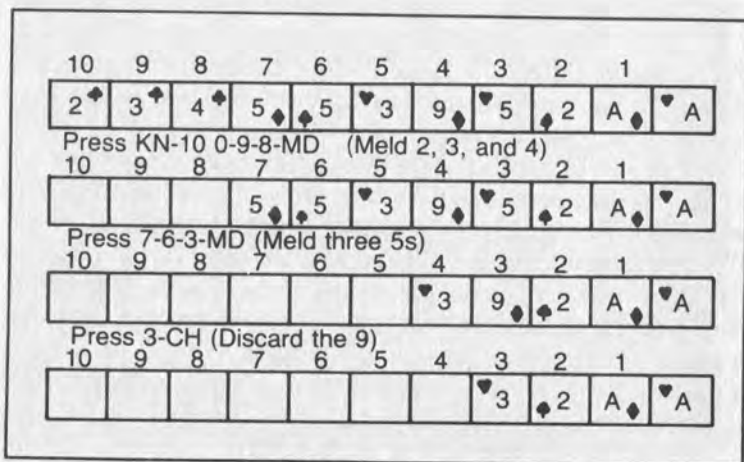


Fig. 5-16. Melding your matched cards in Gin Rummy.

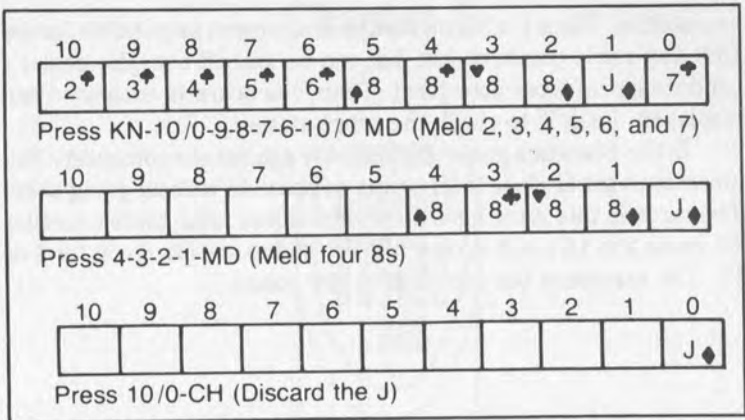


Fig. 5-17. Melding a Gin hand.

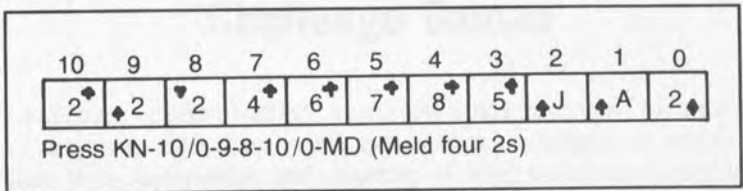


Fig. 5-18. Melding cards when 10 and 0 are in the same set.

If the dealer knocks first or gets GIN, his cards are displayed face up, including the discard in position 0, you will hear a beeping sound. Press DS to see your hand. Since you don't pick up, there is no card at position 0. Now try to meld as many sets of matched cards

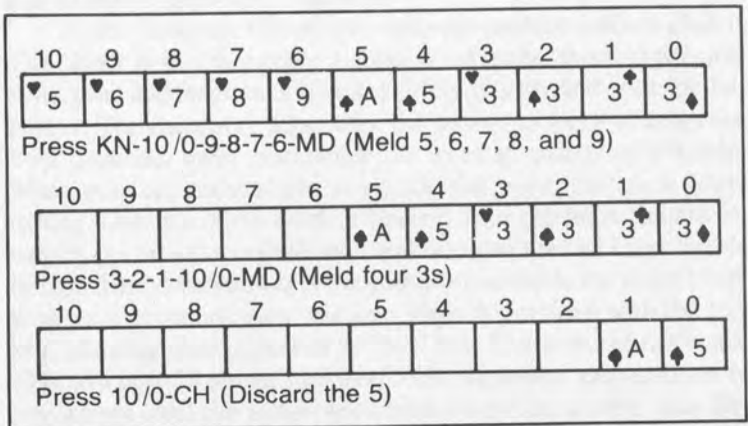
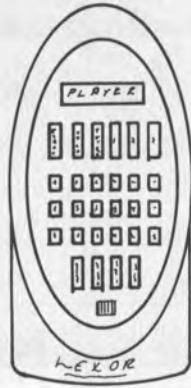


Fig. 5-19. Melding cards when 10 and 0 are not in the same set.

as possible. When you've melded as many cards as possible, press CH. Any cards you have left that can be laid off onto the dealer's hand disappear from your hand. Then, the score is computed and displayed. Push T to check the score status.

In the Blackjack game you also play against the computer. The object is to get as close to 21 points as possible without going over. The cards in this game have numerical values: face cards count for 10, cards 2 to 10 count at their values, and an ace can count for 1 or 11. The maximum bet per hand is 999 points.

Chapter 6



Challenge Games

Challenge, or mind-baffling, games challenge your mind by means of anagrams, deduction, word and number combinations, and the like. Wits, knowledge, and a number of other brain/mind insights are needed to play these games. They are surely challenging, because the computer is controlling the game(s).

BRAIN BAFFLER

Brain Baffler word and number game by Mattel Electronics is actually eight games in one. It looks like a calculator but has a full alphanumeric keyboard (Fig. 6-1).

In the Anagram Game, you compete against another player. The object is to unscramble a given word in the shortest possible time your opponent uses this key. Help is provided with the buy button. The computer scrambles the letters to form an anagram. Your opponent must unscramble the word as quickly as possible. When your opponent starts to uncode the word, the clock starts ticking. One tick of the clock is 1 point. Your opponent can ask for help by pushing the refresh key, and the computer will rescramble the word in a different way. Five points are added to the score every time your apponent uses this key. Help is provided with the buy key, allowing your opponent to "buy" the first letter of the word. This will cost 25 points, however. Your opponent can continue to buy letters until the actual word appears on the screen, thus forfeiting the game. The lowest score in this game wins!



Fig. 6-1. Brain Baffler by Mattel Electronics.

Build-A-Word is also a two-player game. The object of the game is to build a word from letters randomly provided by the computer. You and your opponent play simultaneously and, through a series of challenges and plays, attempt to build a word and score. High score in this game wins, with the maximum score being 999 points. There is no time limit.

Flash Word is another two-player game. You and your opponent each try to be the first to unscramble the longest word from a series of random letters. If, from the scramble I R B K H N F A , you deduct the word "hair," and your opponent deducts the word "brain," your opponent wins, because brain is one letter longer than hair.

Third Degree Flash Word is similar to Flash Word but with one difference. It has three randomly changing letters, while Flash Word has only one.

Copy That is a game that can be played by one or two players. The object of the game is to guess numbers in the proper sequence. One player challenges another player to repeat a sequence. In the eight-character display, numbers continue to be added until they eventually shift off the screen. You and your opponent challenge one another to memorize the sequence of numbers.

In Go Hang you enter a word, and the computer hides it. Your opponent must guess the correct letters in the word or lose points.

Concussion I and Concussion II are code-number games. The object in Concussion I is to guess a specific sequence of numbers that the computer has generated. Scoring is based on how many

guesses it takes you to discover the code. In Concussion II, another player generates the secret code, instead of the computer.

SCRABBLE BRAND LEXOR

Scrabble brand Lexor computer word game (Figs. 6-2 and 6-3) from Selchow & Righter is an electronic war of words. It is an electronic version of the Scrabble brand crossword game (Selchow & Righter). Seven letters are displayed on the game's alphanumeric board. Each letter has a Scrabble point value.

The unit can be used in three modes. In Flash Mode, up to four players race against the electronic timer to see who can form the most words and score the most points. Solo Mode challenges you to find the highest scoring words in 14 turns. You can also play against an opponent; the player with the highest score after an agreed

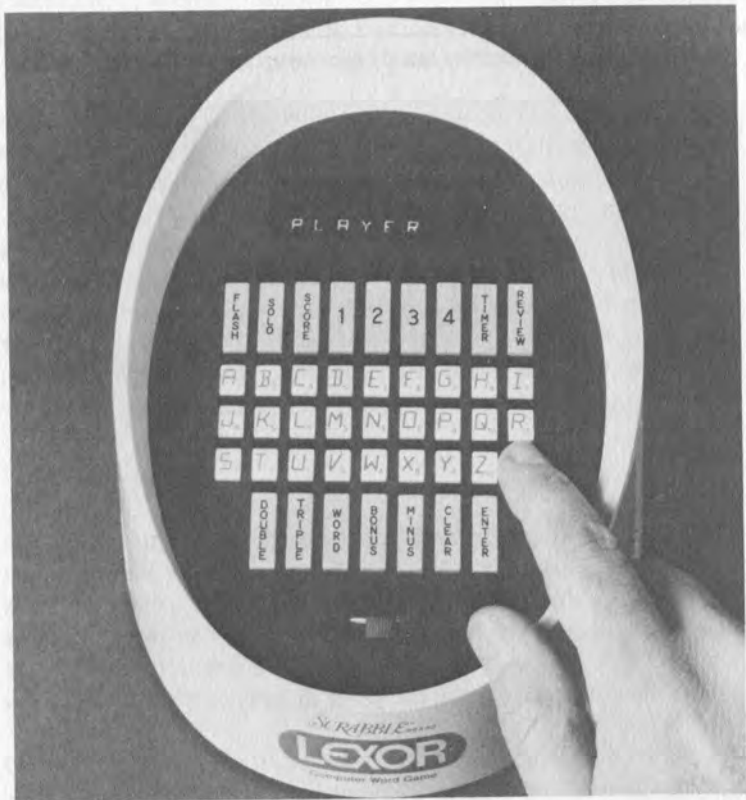


Fig. 6-2. Scrabble brand Lexor electronic word game (courtesy Selchow & Righter).

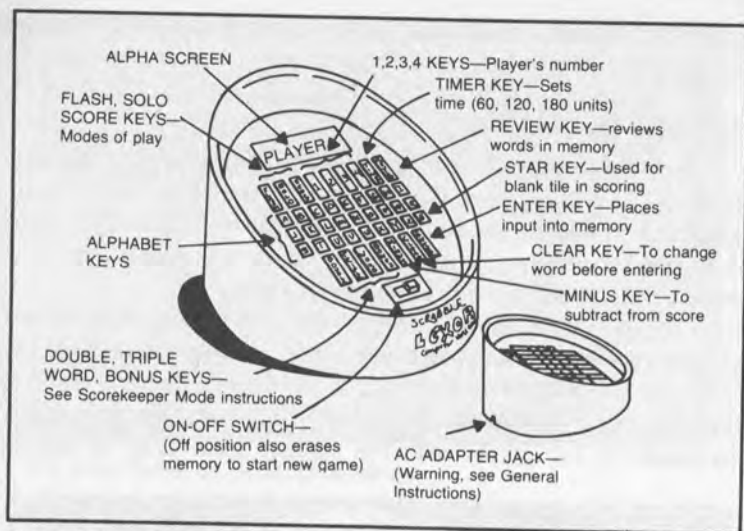


Fig. 6-3. Controls for Scrabble brand Lexor computer word game.

number of rounds is the winner. Scorekeeper Mode uses the Lexor to keep score while you play the Scrabble brand crossword game. In this mode, Lexor computes the score for each turn and keeps a running total for each player.

A variation of Scrabble brand Lexor is Selchow & Righter's Scrabble brand Sensor (Fig. 6-4). In the two-player mode, you program a word into the computer, and your opponent tries to deduce the word letter by letter. As he or she does so, the computer flashes clues to the position and accuracy of the guessed letter. When you play solo you test your wits against those of the computer.

COMP IV

Built on a single printed circuit board that utilizes a multiple keyboard and a game chip, Milton Bradley's Comp IV has printed on its box, "I Am Programmed To Beat You." The idea of this game is to logically deduce the numbers and their order in as few tries as possible. You can program the unit to operate with three, four, or five number strings to make the game as easy or as difficult as you like (Fig. 6-5).

When the Comp IV is first turned on, it selects one of 32,000 random-number combinations. By using the keyboard and a specially designed form (Fig. 6-6) you must guess and deduce the number.

To play three-number game, your first entry through the keyboard is 1 2 3. The unit returns a response of 1 in the number column, the left column on the unit, and a 0 in the sequence column, the right column on the unit. This tells you that either the 1, 2, or 3 is included, but whichever it is, it is not in the correct place. Make a note as shown in Fig. 6-7A. Now, you go for a “process of elimination,” and you enter 0 3 2. The response from the computer is a 1 in the entry column and a 1 in the output column. You know now that either one of these numbers is not only correct but also in the right place. Make a notation on the form (Fig. 6-7B).

Next, you enter the number 4 and, again, 3 and 2, 4 3 2, for which the computer’s response is 1 for the entry column and 1 for the output column. This tells you that 0 is not one of the digits and neither is 4. You know this, because if the 0 had been correct, substituting another number for it would have adversely effected the response. You also know that only one of the numbers was correct and that it was in the right place. If 4 was a correct number,



Fig. 6-4. Scrabble brand Sensor computerized word game (courtesy Selchow & Righter).



Fig. 6-5. Comp IV, a computer programmed numbers game (courtesy Milton Bradley Electronics).

it would have added to the Comp IV's response. You know now that either the 3 or the 2 is correct and in the right place. The 4 and 0 are circled in the "out numbers" box (Fig. 6-7C).

Now, enter 4 5 2. Often, it is a good idea to substitute another digit for a possible correct one. If the response is adversely affected, you know that the original number was correct. The computer's response in this case remains 1 and 1, telling you that the 3 and 5 are incorrect and that the 2 is correct in its third place position. The 3 and 5 are circled as out numbers, and 2 is entered in the third place under numbers in position (Fig. 6-7D).

Enter some digits you have not tried before, and they are entered along with the 2. The entry 7 8 2 receives a response 2 and 2 from the computer. This tells you that in addition to the 2, either the 7 or the 8 are correct and in the right place (Fig. 6-7E). In your next entry, the 8 in the 7 8 2 input is replaced by the 0, which you know to be incorrect. The 7 0 2 entry receives a 1 and 1 response, telling you that the 0 replaced the correct 8. The 8 is in the second place and is entered in numbers in position. The 7 is circled as out. You have thus deduced that the three-digit number has 8 and 2 as its last digits, and that 1, 6, and 9 are possibilities for the first digit. You enter 9 8 2, and receive a response of 2 and 2, so the 9 is entered as out. Now, you try 6 8 2, and this entry is answered by a screen of flashing lights. You have solved the secret number in eight steps (Fig. 6-7F).

READER'S DIGEST Q & A

This game, by Selchow & Righter, is two games in one. You can use the computer to test your "Word Power" (based on *Reader's Digest* well-known feature), or your "Brain Power," which covers such brainteasers as, Buffalo Bill's true identity, the home of the world's only female Santa Claus, the home of the original phantom of the opera, and the meanings of coruscate, asperity, lanyard, and 2,000 other words.

The game can be played in two modes: solo player and you against another player. The game comes with two booklets, each designed to fit into the game console (Fig. 6-8).

COMP IV[®]

ENTRIES	OUTPUT NOS. : SEQ.	ENTRIES	OUTPUT NOS. : SEQ.
1	:	1	:
2	:	2	:
3	:	3	:
4	:	4	:
5	:	5	:
6	:	6	:
7	:	7	:
8	:	8	:
9	:	9	:
10	:	10	:
11	:	11	:
12	:	12	:
13	:	13	:
14	:	14	:
15	:	15	:
16	:	16	:
17	:	17	:
18	:	18	:

"SURE" NUMBERS

0 1 2 3 4 5 6 7 8 9

"SURE" NUMBERS

0 1 2 3 4 5 6 7 8 9

"OUT" NUMBERS

0 1 2 3 4 5 6 7 8 9

"OUT" NUMBERS

0 1 2 3 4 5 6 7 8 9

NUMBERS IN POSITION

|_|_|_|_|_|_|_|_|_|

NUMBERS IN POSITION

|_|_|_|_|_|_|_|_|_|

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Fig. 6-6. Entry form to help you deduce the hidden number in Comp IV (courtesy Milton Bradley Electronics; copyright © 1977 by Milton Bradley Co.).

A

COMP IV [*] ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		1	0	1				
2							2				
3							3				
4							4				
5							5				
6							6				
7							7				
8							8				
9											

B

COMP IV [*] ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		1	0	1				
2	0	3	2		1	1	2				
3							3				
4							4				
5							5				
6							6				
7							7				
8							8				
9											

C

COMP IV [*] ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		1	0	1				
2	0	3	2		1	1	2				
3	4	3	2		1	1	3				
4							4				
5							5				
6							6				
7							7				
8							8				
9											
18							17				
							18				

"SURE NUMBERS" 0 1 2 3 4 5 6 7 8 9	"SURE" NUMBERS 0 1 2 3 4 5 6 7 8 9
"OUT NUMBERS" ① 1 2 3 ④ 5 6 7 8 9	"OUT" NUMBERS 0 1 2 3 4 5 6 7 8 9
NUMBERS IN POSITION	NUMBERS IN POSITION

Fig. 6-7 Sample of deduction process and use of scorepad.

COMP IV^a

ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		0	1					
2	0	3	2		1	1					
3	4	3	2		1	1					
4	4	5	2		1	1					
5											
6											
7											
8											
17											
18											

"SURE" NUMBERS
0 1 2 3 4 5 6 7 8 9

"OUT" NUMBERS
0 1 2 3 4 5 6 7 8 9

NUMBERS IN POSITION
2

D

COMP IV^a

ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		1	0					
2	0	3	2		1	1					
3	4	3	2		1	1					
4	4	5	2		1	1					
5	7	8	2		2	2					
6											
7											
8											
9											

E

COMP IV^a

ENTRIES				OUTPUT NOS. SEQ		ENTRIES				OUTPUT NOS. SEQ	
1	1	2	3		1	0					
2	0	3	2		1	1					
3	4	3	2		1	1					
4	4	5	2		1	1					
5	7	8	2		2	2					
6	7	0	2		1	1					
7	9	8	2		2	2					
8	6	8	2								
9											
17											
18											

"SURE" NUMBERS
0 1 2 3 4 5 6 7 8 9

"OUT" NUMBERS
0 1 2 3 4 5 6 7 8 9

NUMBERS IN POSITION
6 8 2 1

F



Fig. 6-8. Reader's Digest Q & A computer question and answer game (courtesy Selchow & Righter).

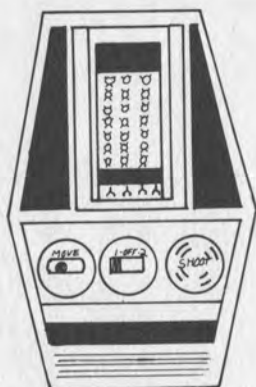
Word Power is a 96-page booklet containing questions adapted from the popular *Reader's Digest* feature, such as To Have a Word, Use a Word; Lincoln Language; The Gist in a Hurry; On the Stump; Book Words and Talk Words; A Rainbow on Your Tongue; Double-Takes; A Queer Quorum; Here's Cavett; Funny, You Don't Look Arabic; Pow Bop Zing; Apples of Gold; Washed up at 25?; and others.

Brain Power, a 64-page booklet, is a collection of quizzes testing your knowledge in 32 high-interest categories. The 62 topics include such items as sports, Americana, nostalgia, movie stars, outer space, travel, science, and history.

You simply punch in the code to tell the computer which question you want to answer. Then, by pressing A, B, C, or D, you enter your answer. If you answer correctly, you are credited with 10 points. Since each quiz category contains 20 questions, you can score a maximum of 200 points per quiz. A zero score is entered in the computer when you answer incorrectly at the first try, and if you try again and answer incorrectly, minus 10 points are entered. A score of 50 to 80 points on each quiz category ranks you as an amateur; 90 to 120 points classifies you as a rookie, 130 to 160 points makes you a player, and if you score 170 points and above, you are a master.

With 94 quiz categories in the Word Power game and 62 in the Brain Power game, each having 20 questions, you have a total of 3,120 questions to answer. These are masterful, challenging games to test your knowledge.

Chapter 7



War Games

Most of the handheld space warfare electronic games are similar to each other, and similar in concept to the popular arcade games. You must avoid alien rockets, attack roving UFOs, and shoot down as many invaders from outer space as possible. In most cases, the computers randomly send invaders to earth with accompanying sound effects. Hand controls on the games allow you to evade the invaders and shoot your rockets to eliminate the attackers.

COSMIC COMBAT

Avoid alien rockets and attack roving UFOs zooming through outer space in Tomytronic's Cosmic Combat game (Fig. 7-1). The game pits you against a relentless computer. Your mission is to avoid alien rockets while trying to conquer an outer space invasion force.

Set the switch to skill level 1 or 2. Select the number of missiles from 1 to 5. Press the shoot button to fire at invading missiles and UFOs. To avoid alien rockets, move your battle station from left to right with the escape switch (Fig. 7-2). You have to move fast. Watch the incoming rockets and UFOs. If you score the maximum points allowed, 999, the game automatically ends, complete with a wild fanfare.

Hitting a UFO is worth a possible 20, 30, or 40 points. Hitting an alien invader is worth either 2, 3, 4, 5, or 6 points. The closer they are to your base, the more points they are worth when shot



Fig. 7-1. Cosmic Combat computerized warfare game.

down. If you shoot down all the invaders, on the screen, they keep reappearing at the top of your screen until you score the maximum of 999 points.

FIRE AWAY

Tandy's Fire Away (Fig. 7-3) lets you choose one of three play

levels, ranging from slow to fast. Move your missile station from left to right to aim at the invaders or UFOs, but watch out, because your station will explode when struck by an invader beam. You have three stations at your disposal. Defend your G-zone, and do not allow the invaders to capture it; you're lost when they do. You win when you score 199 points.

ELECTRONIC SPACE INVADER

Electronic Space Invader (Fig. 7-4) from Entex Industries, packs in a lot of action with multishaped LED vessels, including an alien command ship, attack ships, ground defenders, bombs, missiles, rockets, and a beam force cannon. Attack ships attempt to bomb ground defenders and your beam force cannon as they are moving down. You have to maneuver your cannon, avoiding alien

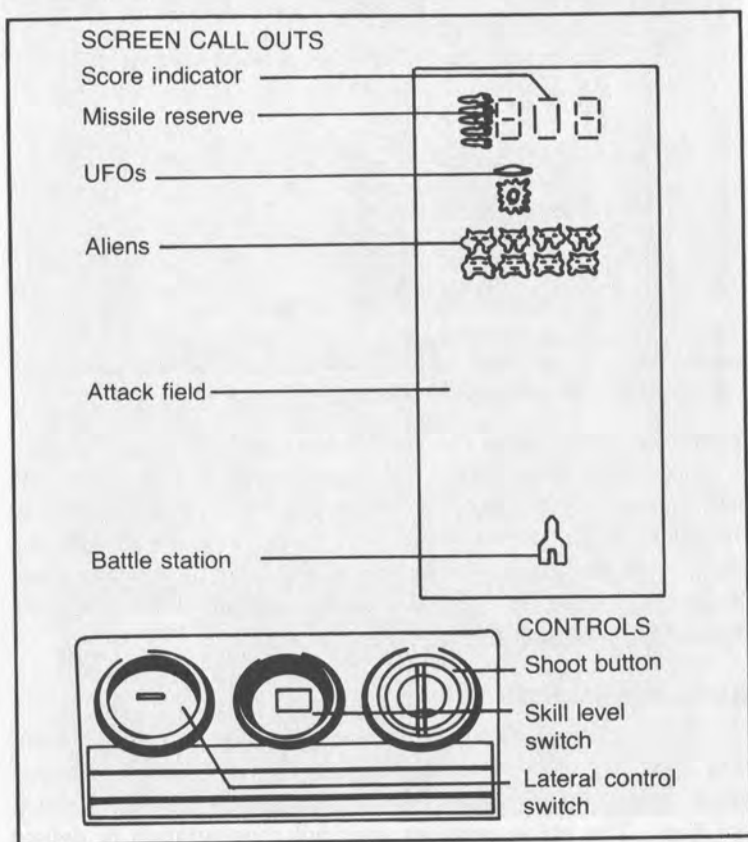


Fig. 7-2. Screen call outs and controls of Cosmic Combat.

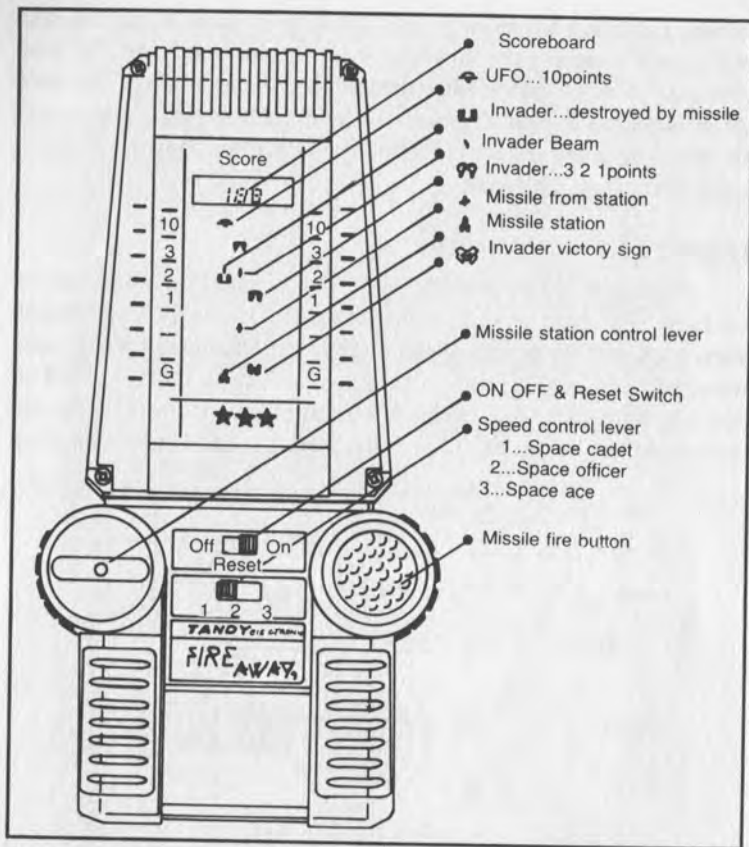


Fig. 7-3. Fire Away computerized warfare game.

bombs, and shoot down the invader force as quickly as you can.

As you progress in the fight against the invading force, the action becomes faster. You can fire an unlimited number of shots at the enemy as long as you avoid being hit by them. Destroying the elusive mother ship nets you a bonus. You can play at professional or amateur level (Fig. 7-5), scoring a maximum of 999 points—a tough, but exciting feat.

ELECTRONIC GALAXIAN 2

This game from Entex Industries looks like an alien ship itself (Fig. 7-6). The three-color fluorescent display shows illuminated aliens, galaxy ships, moving stars, bombs, missiles, reserve ships, and flags. The action requires your full concentration to defend against the attacking convoy, which can occupy any of almost 100

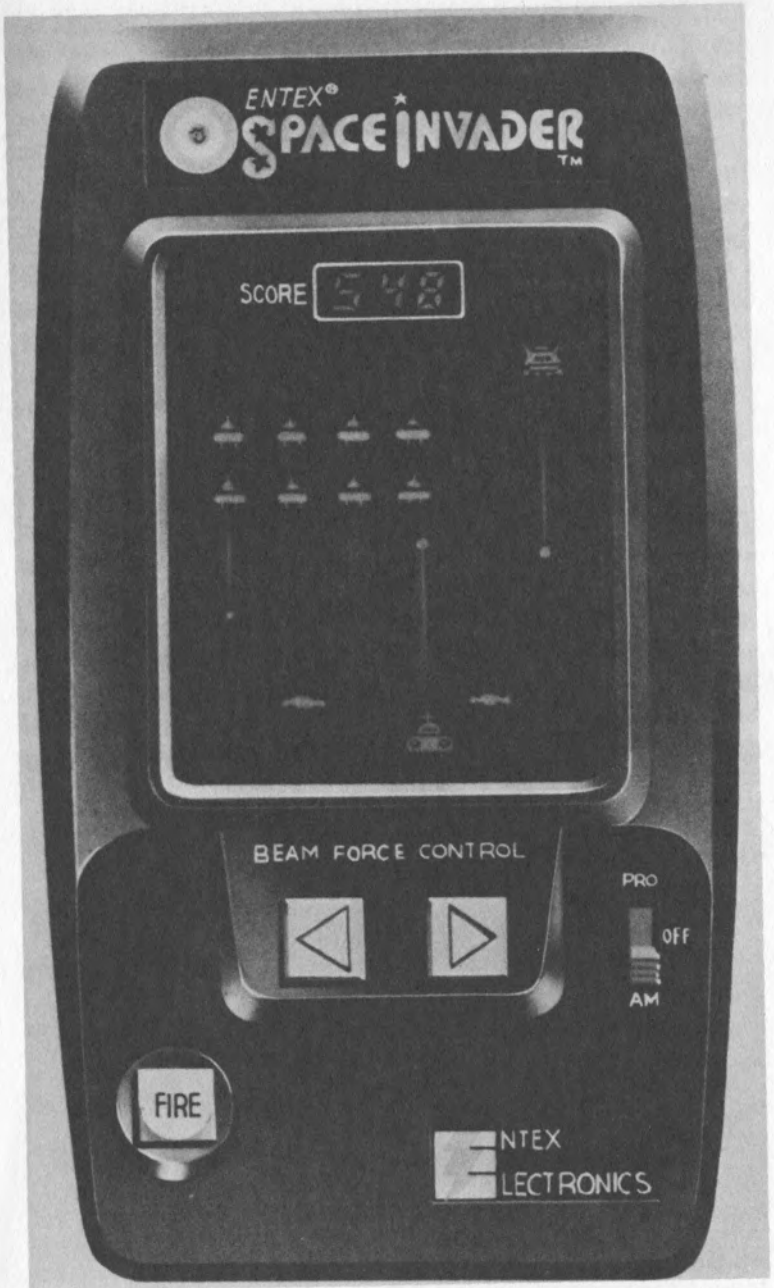


Fig. 7-4. Electronic Space Invader computerized warfare game (copyright © 1980 by Entex; reproduced courtesy Entex Industries Inc.).

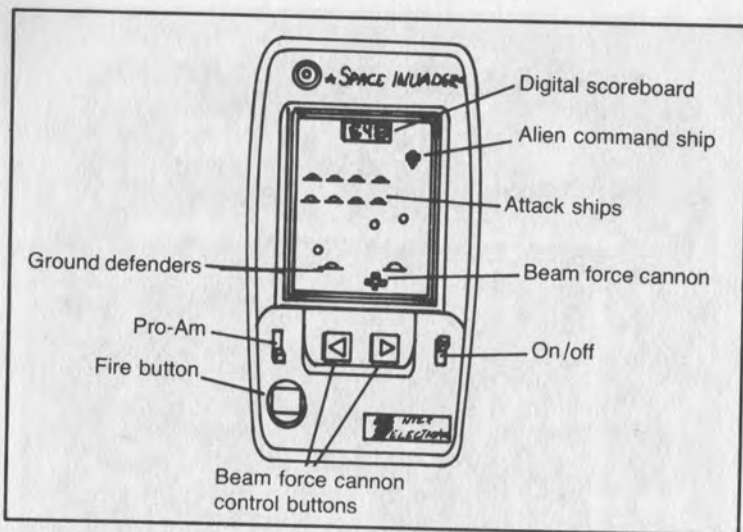


Fig. 7-5. Controls and screen display of Space Invader.

positions. When the aliens break away from the convoy, they drive, turn, and even loop, while showering you with bombs. You must avoid or intercept the bombs while firing on the attacking aliens with your own missiles.

The object of the game is to score as many points as possible by destroying the fleet of attacking aliens with missiles fired from your

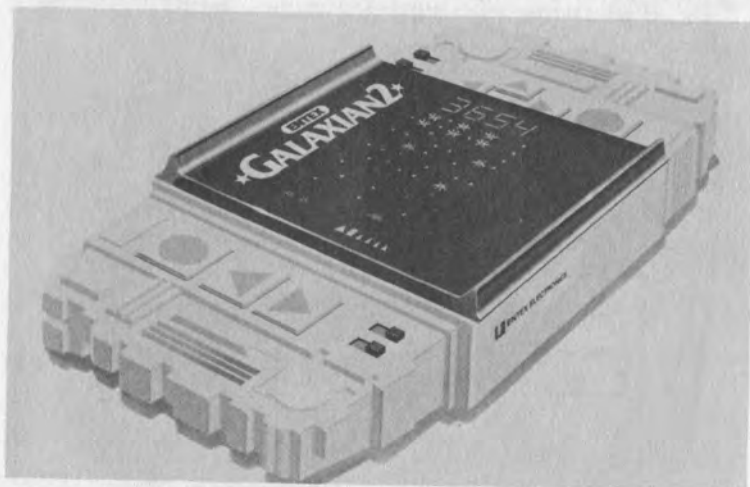


Fig. 7-6. Electronic Galaxian 2 computerized warfare game (copyright © 1981 by Entex; reproduced courtesy Entex Industries Inc.).

galaxy ship. In the one-player mode, you command the galaxy ship, and the computer commands the alien fleet against you. In the two-player mode, you command either the galaxy ship or the alien fleet. Your opponent takes the other side in a One-on-One space battle.

The galaxy ship is colored red and can be maneuvered right and left by using the control buttons (Fig. 7-7). Pushing the fire button shoots a missile from the ship. The red missile at the top of the ship indicates a missile is ready to be fired. When your ship is hit by a bomb or alien, it disappears, and a new ship appears. At the start of the game, you have three ships at your disposal, one active and two in reserve. For each 2,000 points scored, an extra ship is awarded to you. In this way, you can have up to eight ships in reserve.

Aliens are colored blue and appear at the top of the screen (Fig. 7-8). Each time an alien is destroyed by your missile, you are awarded 3 points. These "convoy" aliens do not fire bombs at your galaxy ship. The "attacking" aliens are also colored blue. They have left the convoy to attack your galaxy ship. Every time you destroy an attacking alien, 30 points are awarded to you. The missiles/bombs, colored red are fired by the aliens at your galaxy ship.

When all the aliens on the display are destroyed, a new fleet appears. The flag display, colored blue, indicates how many fleets have been destroyed. These flags have four different values: a small triangle, of which there are four, is 1 fleet; a rectangle, of which there is one, is 5 fleets; a large triangle, of which there are nine, is

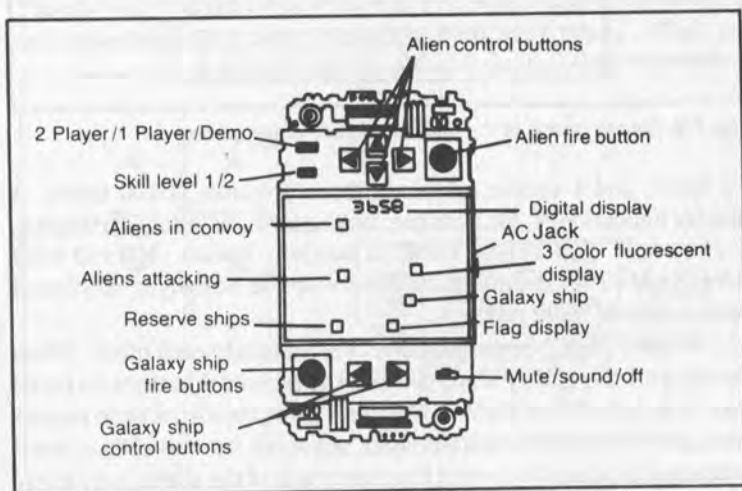


Fig. 7-7. Controls of Electronic Galaxian computerized space battle game.

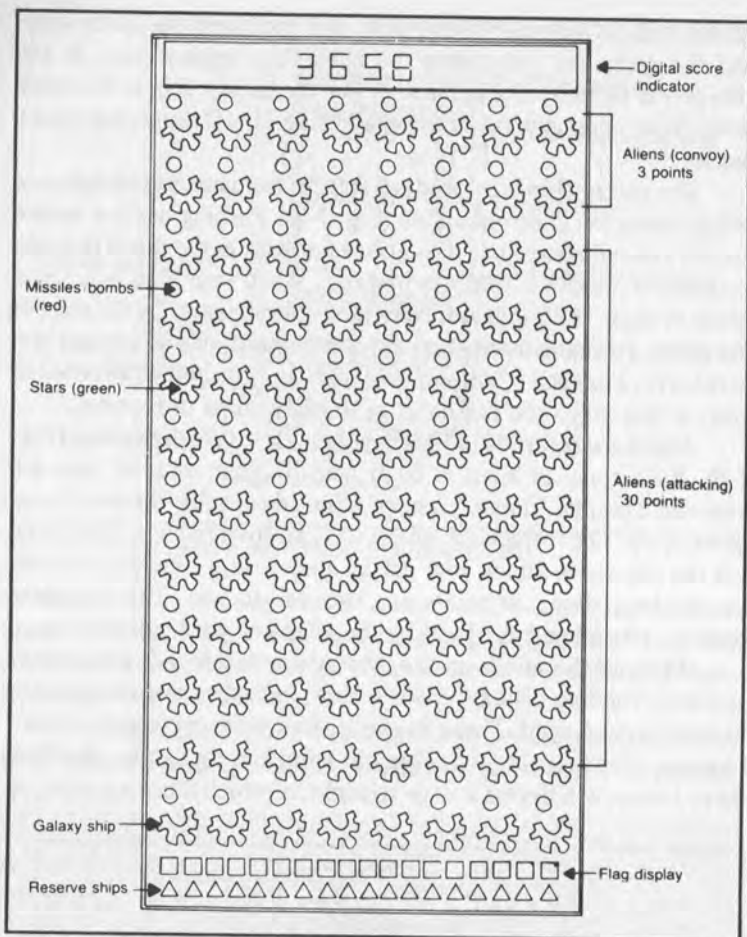


Fig. 7-8. Screen image of the Galaxian space battle game.

10 fleets; and a square, of which there are two, is 100 fleets. A display indication of, for example, one square, three large triangles, a rectangle and three small triangles, means $100 + (3 \times 10) + 5 + (3 \times 1) = 138$. A total of 299 fleets can be destroyed for a total point score of 9999 points.

In the two-player mode, players sit opposite each other. When you control the galaxy ship, you have two control buttons to move your ship from left to right to fire missiles at the aliens or to escape from alien bombs or missiles. Your opponent has the alien control buttons with which to control the movement of the aliens in a variety of ways, left, right, up, down, and in a diagonal pattern (Fig. 7-9).

This is accomplished by holding down two buttons at the time.

ALIEN ATTACK

Alien Attack is a space battle game (Fig. 7-10) from Coleco Industries, utilizing a vacuum fluorescent multicolor display. You can play at two skill levels, using a joystick to move space ships in any of four directions. You use a separate button to launch missiles, which can be fired in four directions as well. Aliens attack in flights of six at a time. They appear as swirling gas masses and move in on your defense ship from all directions, firing destructive beams that are registered in red on the display. Each player gets to pilot three defense ships, one at a time, until they are destroyed by the alien attack or enveloped by contact with an alien.

You can avoid alien fire by taking refuge behind impenetrable space barriers on the display and knocking out aliens with your missiles, registered on the display in green. Success depends on how many alien flights you can wipe out before your three ships are destroyed. Four-digit electronic scoring is provided, and a variety of dramatic sounds enhance the action during play. Once you have destroyed a battery of six aliens, another flight is launched, and the computer automatically increases the speed of the aliens. There are 16 speeds in all.

INVISIBLE ALIEN NEUTRALIZER

They're invisible, and they're invading the planet earth. There's only one way to stop them. You, earthling, have to detect and neutralize these unseen invaders from outer space. When you

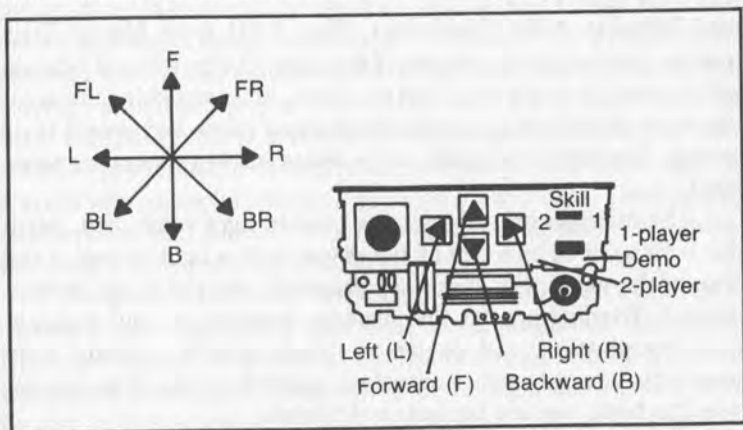


Fig. 7-9. Alien ship controls of the Galaxian space battle game.



Fig. 7-10. Alien Attack space battle game (courtesy Coleco Industries).

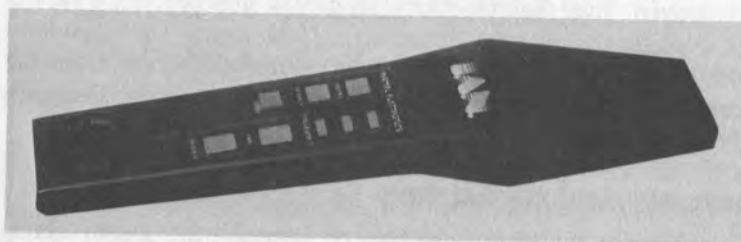
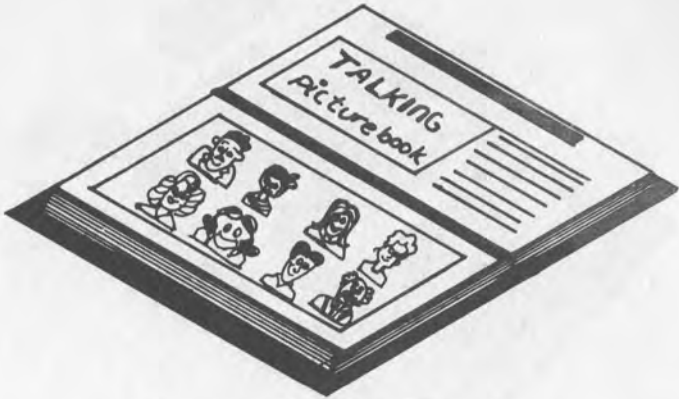


Fig. 7-11. Invisible Alien Neutralizer space battle game (courtesy Mattel Electronics).

play Invisible Alien Neutralizer (Fig. 7-11) from Mattel Electronics, the display informs you of the enemy's strength and location and the energy required to destroy them. After searching the area, you must neutralize four earth-threatening aliens and absorb their energy. You have to be quick, or the aliens weaken your own energy level.

The microprocessor selects a random light value, and, when this light value is matched by the player with a light sensor in the nose of the game, the aliens are detected, and the 4 can be neutralized. Winning against the invaders depends on your reaction time, imagination, and dexterity. Sound effects simulate alien proximity, energy used or absorbed, and the escape of an invader who has been stunned but not neutralized.

Chapter 8



Educational Games

Computer-controlled educational games are designed to sharpen and develop learning skills through fun. The heart of these systems is a small programmable computer that is easy for a child to use alone. Many systems use modules or cartridges, forming an expanding library of fun modules.

THE QUIZ WIZ

With this educational game from Coleco Industries, up to four players can match wits with Quiz Wiz (Fig. 8-1). It begins with the proven Quiz Wiz electronic question and answer format and adds the excitement of direct competition. There are two ways to compete. In one mode, questions are read by someone who is not playing, while each player races to arrive at the correct answers first. The player who is first with correct answers to five questions wins the round. In the second mode, the reader also plays, and all players who correctly answer a question score points. The highest number of correct answers wins the round, and the player who wins the most won rounds wins the game.

The game utilizes 26 cartridge/quiz books, each with a programmed cartridge and a quiz book containing 1001 questions. Electronic lights and sounds as well as automatic scoring heighten the game's excitement. There are four playing stations, each with its own answer selection buttons (Fig. 8-2). The game is played by

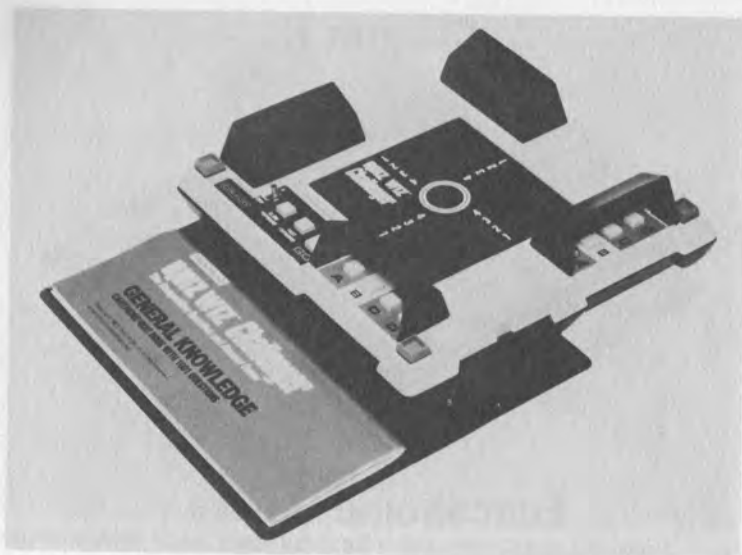


Fig. 8-1. Quiz Wiz computerized educational game (courtesy Coleco Industries).

attaching a cartridge to the console and inserting a quiz book (Fig. 8-3).

After the reader has pushed the OFF/GAME 1/GAME 2 switch, and each player has selected a color marker and checked in by pressing the appropriate button, the reader presses the GO button. Questions and multiple choice answers are read out aloud, and an electronic tune plays and lights circle the console as each player decides on his or her answer. Each player presses the button, A, B, C, or D, that he or she believes answers the question correctly. The station for each player who answers correctly lights up, and a light goes on next to the numeral 1, indicating 1 point scored. Answering time for each player is about 30 seconds. The computer automatically advances to the next question. The first player to score 5 points or the player who has the most right answers after 10 questions wins the round.

In the second mode of play, only the first player who answers correctly scores.

The large number of cartridge/quiz books available is shown in Fig. 8-4.

THE ELECTRONIC LEARNING MACHINE

This educational computerized game (Fig. 8-5) from Coleco Industries offers words to spell, pictures to match, songs to play,

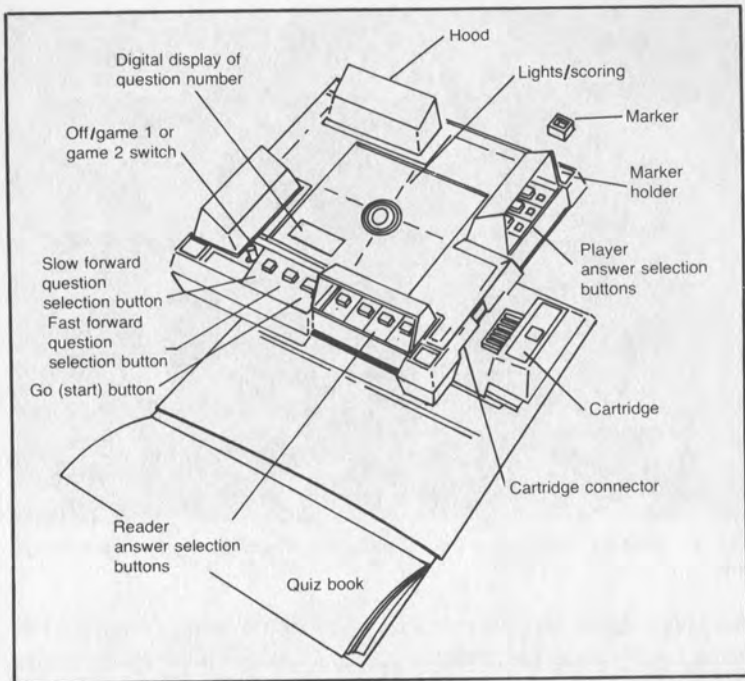


Fig. 8-2. Setup and features of Quiz Wiz educational game.

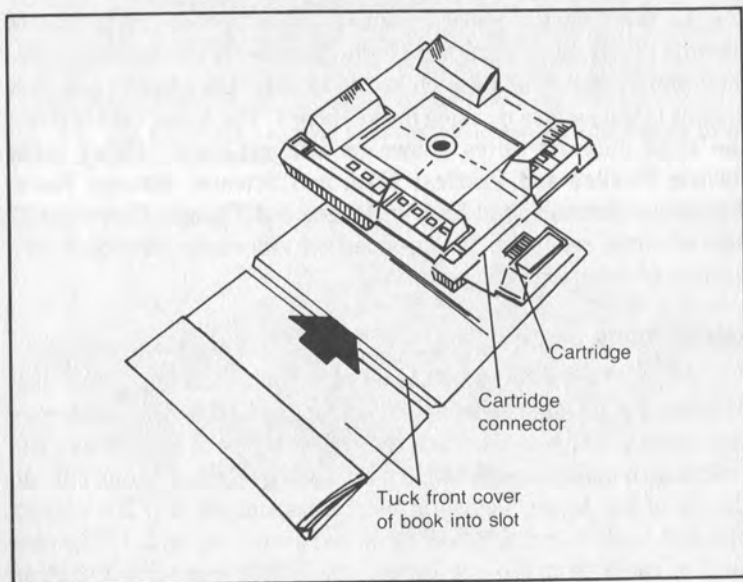


Fig. 8-3. Use of cartridge and book in Quiz Wiz educational game.



Fig. 8-4. Quiz Wiz cartridges from Coleco Industries (courtesy Coleco Industries).

riddles to solve, and questions to answer on many different topics, using a card reader, a cartridge pack, and microprocessor. If you're right, the machine tells you so with green lights and a happy song. If you're wrong, you get red lights and a sad tune.

In the "what's missing picture matches," the child has to identify the missing component in the picture. In the spelling game, a picture is shown and the child has to spell the word that corresponds to the picture by using the keyboard. The music card teaches the child different notes shown on colored bands. Other cards include Riddles and Puzzles; Math and Science; Strange Facts; Plants and Animals; and People, Places and Things. There are 12 sets of cards, each with 36 two-sided activity cards, offering a wide variety of questions and answers.

MAGIC TOUCH

Magic Touch (Fig. 8-6) is an electronic matching game that consists of an electronic touching mechanism and a number of two-sided activity cards. Each card has a series of black dots. The child has to make a correct match by placing a finger on one dot and the tip of the Magic Touch on the corresponding dot. If a correct match is made, a red light will go on and a buzz will sound. The nine sets of cards from Coleco Industries feature over 200 matching activities.



Fig. 8-5. The Electronic Learning Machine computerized educational game (courtesy Coleco Industries).

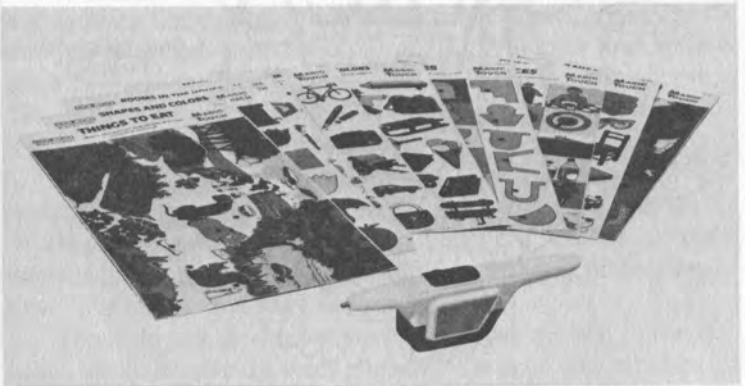


Fig. 8-6. Magic touch educational game (courtesy Coleco Industries).

OWLY

This is a four-game unit (Fig. 8-7) from Tiger Electronic Toys. In Repeat the Numbers, the child has to repeat the numbers shown, by pressing the buttons for the same numbers. In Count the Lines, the child has to count red lines, and press the button corresponding to the correct number. When Finish the Eight is played, the child has to complete a missing line from a figure 8 that will appear in the window. The child can learn to read the time in Set the Time. When the time is shown in the window, the child can set that time with the hands of the clock located at the bottom part of the game.

K28 TALKING LEARNING COMPUTER

This talking learning computer (Fig. 8-8) from Tiger Electronic Toys offers a combination of three primary educational activities: mathematics, spelling, and reading readiness. The computer has a 1,500-word vocabulary. Within its 15 modes, the computer introduces children to new facets of the English language, vocabulary expansion and spelling, geography and history, mathematics and problem solving, and social studies and science. Children are able to select subject matter, problem format, and

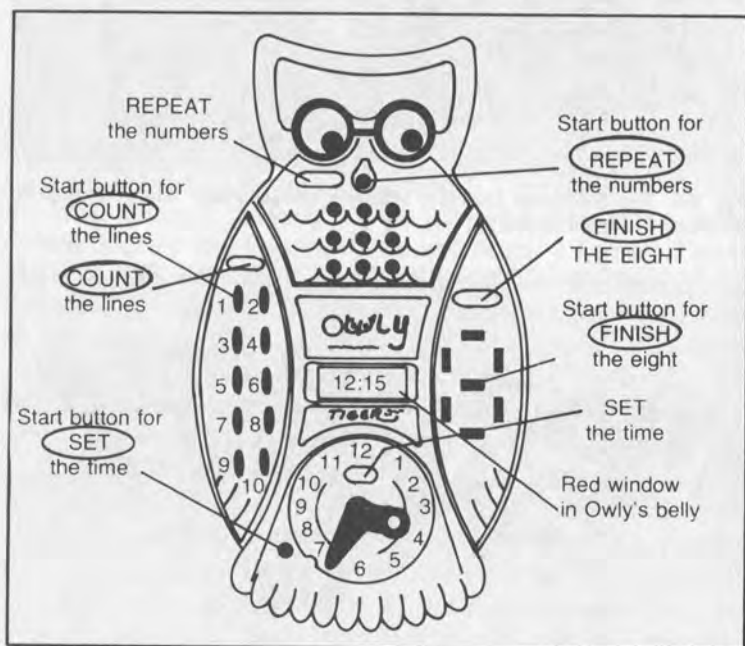


Fig. 8-7. Owly electronic educational game from Tiger Electronic Toys.



Fig. 8-8. K28 talking learning computer (courtesy Tiger Electronic Toys).

level of difficulty. Operational modes include true/false, multiple choice, yes/no, fill-in-the-blank, and spelling exercises.

The computer is very specific and easy to follow and understand. A five year old needs few directions other than to listen closely to instructions and respond on the unit's keyboard. Variations within the computer's response will hold the child's attention; humorous comments are balanced with serious suggestions.

The computer is available in two models: one with a silver horizontal frame, the other in a royal blue frame with a multicolored keyboard. The game has a two-inch speaker, a 56-key pressure sensitive letter/number board, a vacuum fluorescent light display, and headphone jack.

TALKING PICTURE BOOK

This computerized game (Fig. 8-9) from Tiger Electronic Toys is a speaking companion and learning aid designed to capture the attention of curious preschoolers from the time they first learn to speak. Twenty-five story pages offer children fingertip access to 200 objects and corresponding words, to teach word/picture relationships, reinforce correct answers, and encourage learning.

The game talks in a positive and friendly voice and offers immediate response and feedback. The story pages are keyed to the child's everyday life, such as family members, clothes, animals, numbers, anatomy, kitchen items, foods, shapes, professionals, flowers, weather, and days of the week.

The child can choose between one of two modes. In the first mode, the child inserts a story page into the main unit, touches his or her finger to one of the objects in the picture, and the computer

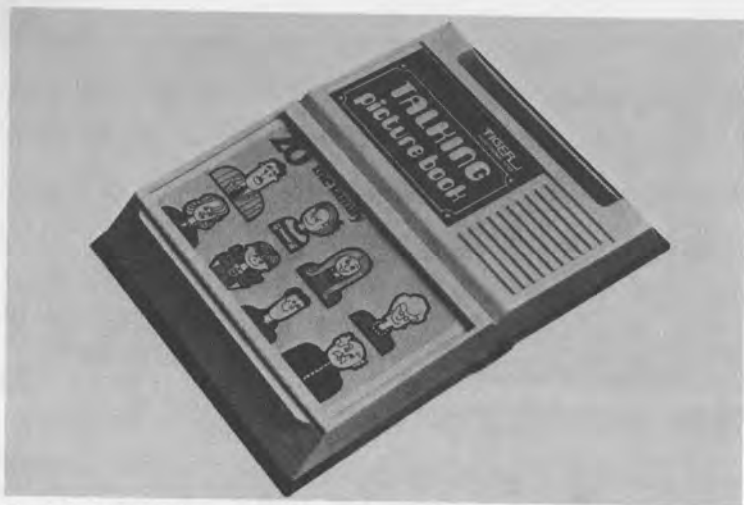


Fig. 8-9. Talking Picture Book computerized educational game (courtesy Tiger Electronic Toys).

responds, "This is a kitchen spoon," or "You have found the fork." In the second mode, the computer asks the child to find the object it describes. "Can you find the cat?" If the child's response is incorrect, the computer offers corrective help and friendly narrative, "No, I'm sorry, that's not the cat. Please try again." When the child is finally correct, the computer encourages him or her to continue by reinforcing the right answer, "That's correct. Very good. Now can you find the dog?"

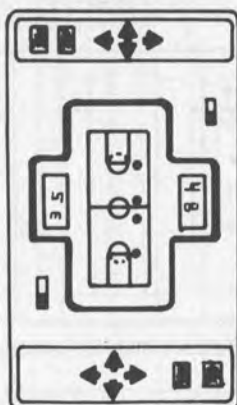
Tiger Electronic Toys plans to offer access to 600 objects.

THE CHILDREN'S DISCOVERY SYSTEM

Mattell Electronics' new computerized educational game features an animated self-contained screen. The computer functions as an entertainment system that progresses with the child as additional software selections become available. Special overlays convert the keyboard for each subject and activity. Cartridges are used for each subject. The keyboard helps the child develop vocabulary, spelling, and writing skills. The music mode allows him or her to play and compose songs while learning musical concepts. The art mode offers the child the opportunity to draw pictures electronically.

Cartridge subjects will include science, history, health, economics, arithmetic, fractions and decimals, geography, strategy, sports games, and many more.

Chapter 9



Sports Games

Sports games cover a multitude of sports, including numerous baseball, basketball, and football games in a variety of styles and capabilities. There are also a number of soccer and hockey games, as well as bowling games. Other available games are darts, boxing, cycle race, tennis, and pool. A number of manufacturers have designed sports centers, offering several games in one package. The newer games offer an increased emphasis on graphics. Pictorial representations of players have been replacing the LED lines of earlier games and provide better simulation of body movements on the display.

ELECTRONIC QUARTERBACK

This computerized handheld football game from Coleco Industries offers a fully controllable offense; computerized defense; two skill levels; pass, block, run, and kick options; electronic sound effects; and digital display of score, position, time, and status. Use of the D key gives you a display showing downs, yards to go, and field position. Releasing and pressing this key again gives you a display of the home score, time remaining, and visitor's score. This game comes with detailed instructions.

When you place the play selector in the run/kick position, a run formation is displayed, and you can attempt a running play. In the run formation, the ball carrier (BC) and the two blockers (B1 and B2) always move in formation (Fig. 9-1). The ball carrier is bright

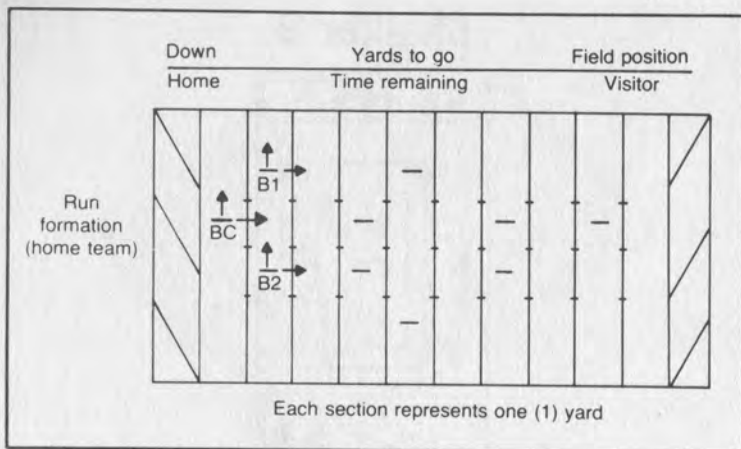


Fig. 9-1. Display of run formation in Electronic Quarterback.

and blinking, the two blockers are bright and steady, and the opposing players (defensive tacklers) are dim and steady.

To begin the action, press one of the directional keys (Fig. 9-2). When you place the play selector switch in the pass position, a pass formation is displayed, and you can attempt a pass. In this formation, only the receiver can be moved, and he must be in line with the ball carrier to complete the pass. The pass receiver and the two pass defenders (PD1 and PD2) are the only players capable of catching a pass. Use the directional keys to maneuver the receiver down the field, and press the K/P (kick/pass) key to initiate the pass (Fig. 9-3).

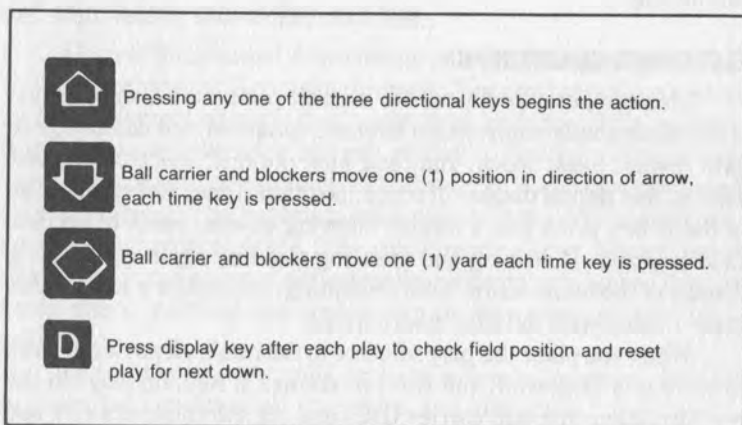


Fig. 9-2. Use of directional keys in Electronic Quarterback.

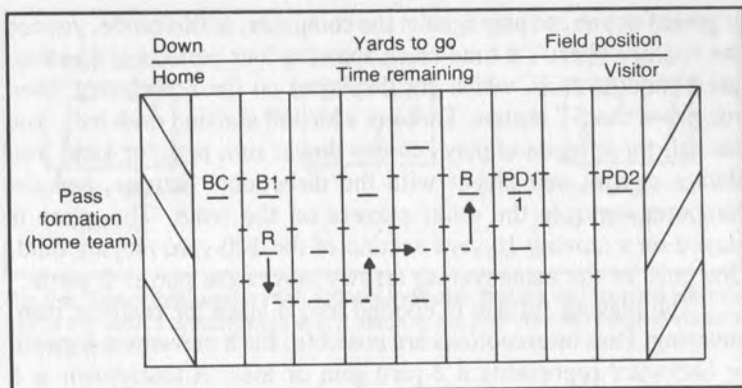


Fig. 9-3. Pass formation display in Electronic Quarterback.

A touchdown is awarded with a 7-point score; a field goal gains 3 points, and a safety 2 points. You can choose between home or visiting team. When you are the home team, your offense moves from left to right; the visiting team moves right to left.

ELECTRONIC COLOR FOOTBALL 4

This computerized football game (Fig. 9-4) from Entex Electronics can be played by two people (visitors in red and home team

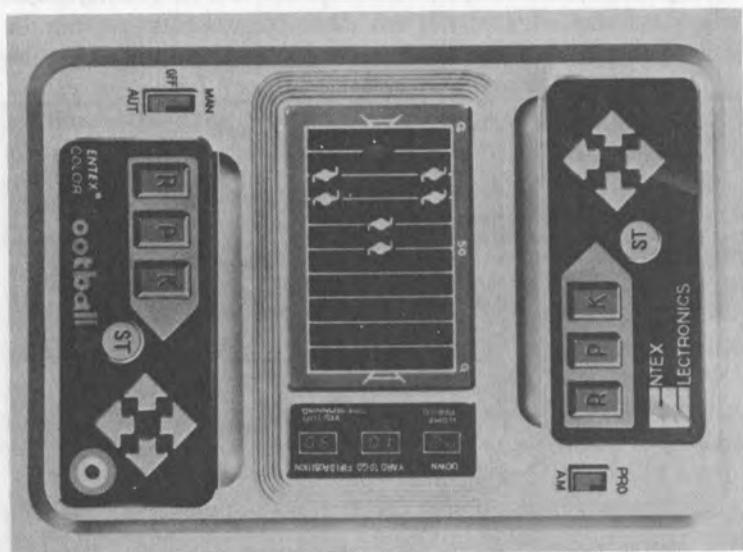


Fig. 9-4. Electronic Color Football (copyright © 1980 by Entex; reproduced courtesy Entex Industries Inc.).

in green) or you can play against the computer. In this mode, you are the visitor. There's a time clock showing four periods of 15 simulated minutes each, which are displayed on the scoreboard when you press the ST button. There is a kickoff starting each half. You can call three types of plays on any down: run, pass, or kick. You always control one player with the directional buttons, and the computer controls the other players on the team. The game is played on a moving 10-yard section of the 100-yard playing field. One push of the maneuvering arrows moves the player 2 yards.

The playing surface is divided into 5 lanes for realistic maneuvering. Pass interceptions are possible. Each movement forward or backward represents a 2-yard gain or loss. A touchdown is 6 points, the point after a touchdown is 1 point, a field goal is 3 points, and a safety is 2 points. Figure 9-5 illustrates the control functions of the game. Field position, downs, and yards to go are displayed as illustrated in Fig. 9-6.

You use the directional buttons to maneuver the quarterback, receiver, or defensive player on the field. Pressing a particular button moves the player two yards in the direction indicated by the arrow. When you play defense, you use these buttons to maneuver your player to tackle the quarterback on running plays, block punts, and field goal attempts; tackle the quarterback or receiver; force incompletions; or attempt to intercept the ball on passing plays. When you play offense, you use these buttons to maneuver the quarterback to avoid the defense, to gain yardage, maneuver the



Fig. 9-5. Control functions for Electronic Color Football 4.

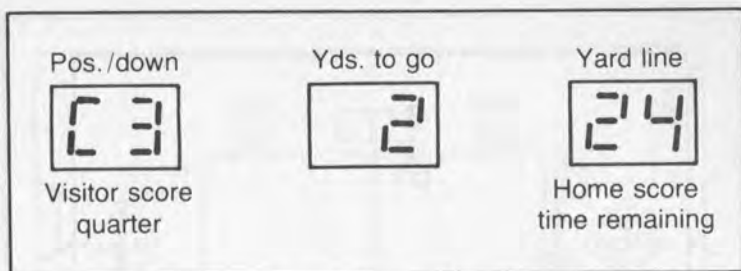


Fig. 9-6. This display under POS. DOWN indicates that the ball is on the visitor's half of the field; it is third down with 2 yards to go, and the ball is on the visitor's 24-yard line.

receiver into position to complete a pass, and to determine the yardage and position of the pass.

The directional buttons are used in conjunction with three other buttons: the P, or pass, button; the R, or run, button; and the K, or kick, button. The P button is used to initiate a passing play by the offense and set up a passing defense by the defensive team. The RUN button is used when you play the offense and want to set up a running play. The defense uses this button to defend against your running play. You use your KICK button in four different situations: kickoffs, field goal attempts, punts, and point after touchdown attempts.

After a touchdown, the ball is moved to the 10-yard line for the point after touchdown (PAT) attempt. To kick the ball, press K. If you are successful, the score flashes three times with sound. The ball then goes to the 40-yard line for kickoff to the opposing team (Fig. 9-7). The end of the game is signaled by three beeps, and the final score is shown as a flashing number.

DELUXE FOOTBALL

This computerized football game from Tiger Electronic Toys is in many respects different from the one described above. Although this game plays football with generally the same rules as the real game, it is the appearance of the players as red and green dots that makes this game different. The game has the following features: one- or two-player mode, nine skill levels, four-digit scoreboard, kick, pass, and run-back options, a coin flip to determine the receiving team at kickoff, punt and field goal options, a Playmaker button for easy single-finger maneuverability of players, fumbles with options for recovery, instant replay, halftime show, and sounds to indicate status of play.

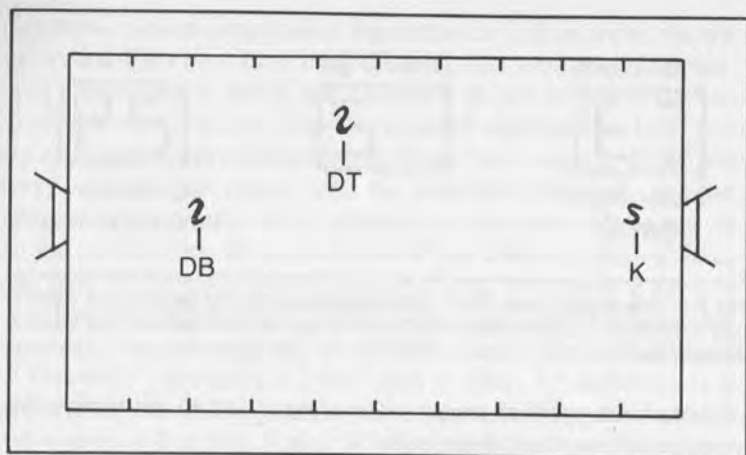


Fig. 9-7. Point after touchdown. When the offense pushes K this formation appears regardless of whether the defense pushes R or P. K is the kicker, and DB is the computer-controlled defense. DT is manually controlled by the defense by using the directional buttons.

The field consists of a 4-by-10 matrix of grid positions (Fig. 9-8). Each position consists of two lights: one green and one red. The 10 positions down the field represent 10 yards during play. When a ball carrier runs beyond the 10 yards, he rolls over to the first position and runs down the field again.

The controls include:

- One Playmaker button for each player. By the movement of one finger at the center of the control, you can easily maneuver the player on the field.
- The pass button is active only when you are the offense and have selected one of the two passing formations.
- The kick button is active only when you are on the offense and want to kick off, select a punt, or kick a field goal.
- The replay/skill button is used to select one of the nine skill levels for the green players and to initiate the instant replay after a play has just concluded.
- The score/skill button is used to select a skill level for the red players' to initiate the scoreboard at the end of each play, to cause a fumble when a tackle is made, and to bypass the instant replay.

The scoreboard display consists of four display digits arranged in two groups of two digits. Kickoffs are performed at the start of the first and third quarters, after touchdowns, field goals, and safeties. Figure 9-9 illustrates a typical display for kickoff or punts. Figure

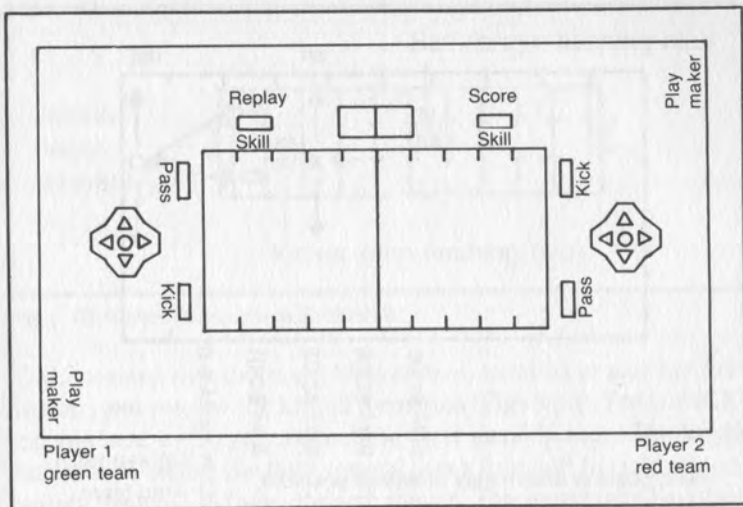


Fig. 9-8. Playing grid of Deluxe Football computerized football game.

9-10 shows a typical display for a field goal. There are four ways to score: a touchdown is 6 points, an extra point is 1 point, a field goal is 3 points, and a safety is 2 points.

FOOTBALL II

Mattel's Football II (Fig. 9-11) is another variation of computerized football. At the start of the game, the score display reads

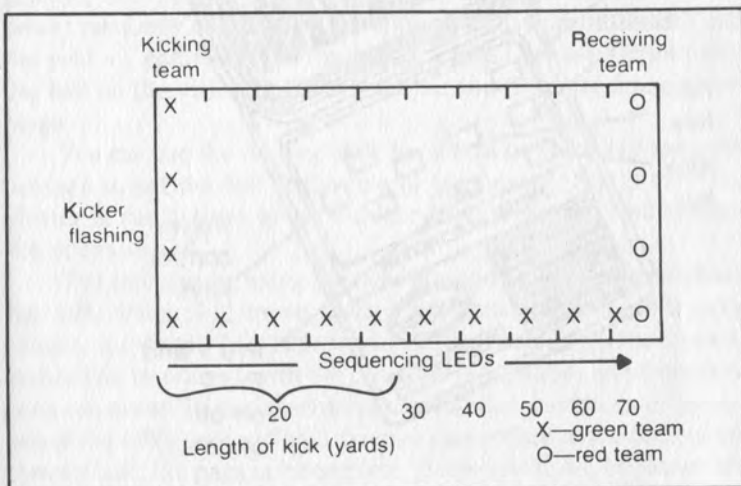


Fig. 9-9. Typical field display for kickoff or punts in Deluxe Football.

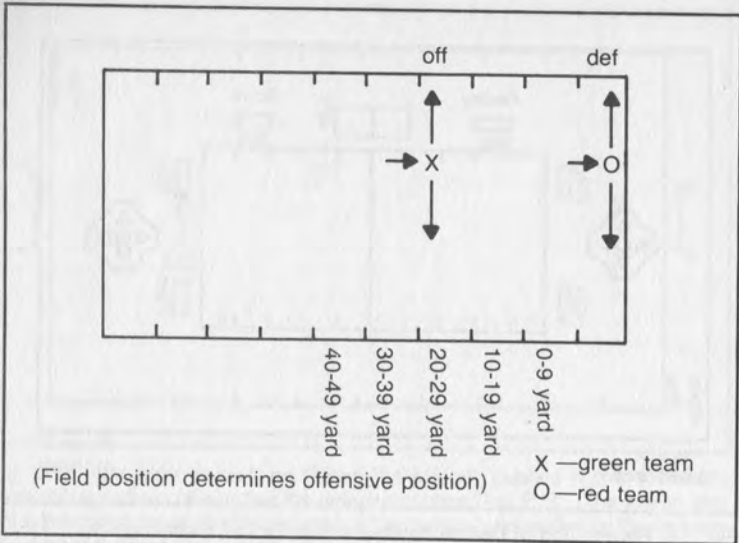


Fig. 9-10. Typical display for a field goal in Deluxe Football.

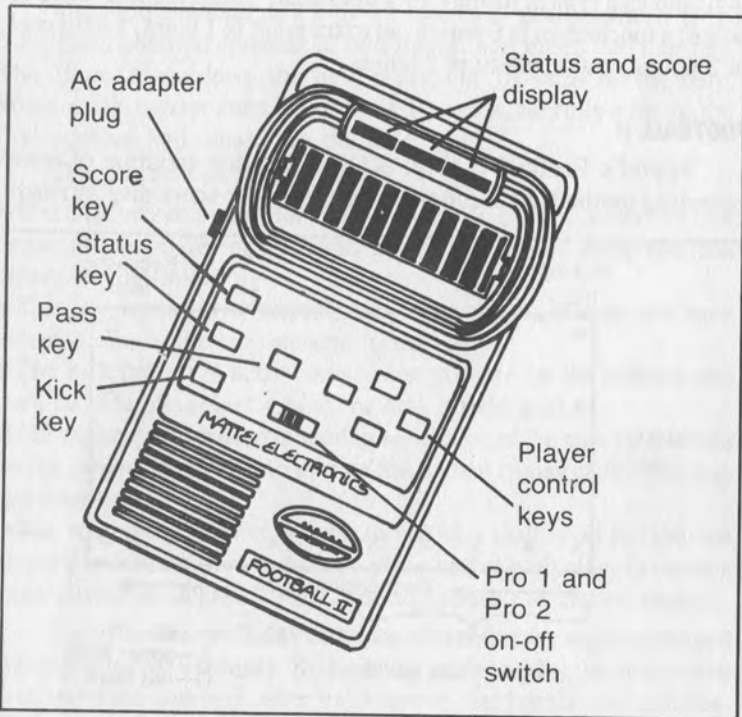


Fig. 9-11. Football II from Mattel Electronics.

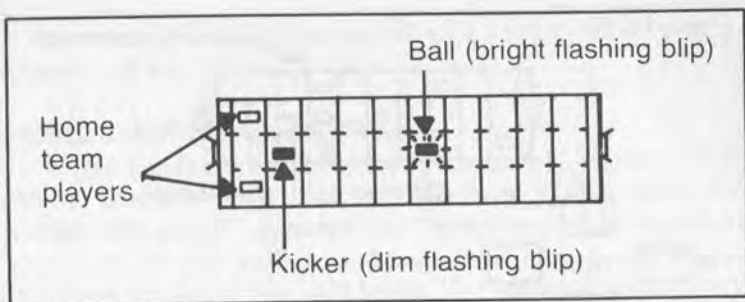


Fig. 9-12. Kickoff formation in Football II.

15.0, meaning that there are 15 simulated minutes to play the first quarter, and you see the kickoff formation (Fig. 9-12). Press KICK, and you hear a charge tune and the start game buzzer. The bright blip sweeps across the field several times from left to right, representing the football flying through the air. The scoreboard becomes a yardage indicator, showing you how far the kick travels. The home team players are the dim blips following the ball.

Suddenly, the ball stops. You see a bright stationary blip. You hear a short beep, and the scoreboard again shows 15.0 minutes. To put the ball in play, you must press one of the run buttons. Try to run the kickoff toward the left goal. When you hear a whistle and see the bright blip flashing, it means the runner has been tackled. Press the STATUS key to see the field position after the runback.

Instead, you may see a bright flashing blip. You hear a double whistle, and the scoreboard shows 15.0 minutes. The kickoff distance, randomly selected by the computer, has taken the ball into the visitors' end zone for a touchback. Press the status key to spot the ball on the visitor's 20-yard line for the first play from scrimmage.

You can use the run key after the status or score key has been pressed to set the ball at the line of scrimmage (Fig. 9-13). The cluster of run buttons gives you four-way directional control over the offensive QB.

You can pass by using the pass key and separate the ball from the QB, which will move toward the pass receiver. When it's caught, the bright blip represents the ball carrier, whose movements you can direct with the run keys. Of course, an incomplete pass can occur. If, during evasive moves, the pass receiver moves out of the QB's lane and no defensive players are in the path of the thrown ball, the pass is incomplete. Some examples of passes are shown in Fig. 9-14.

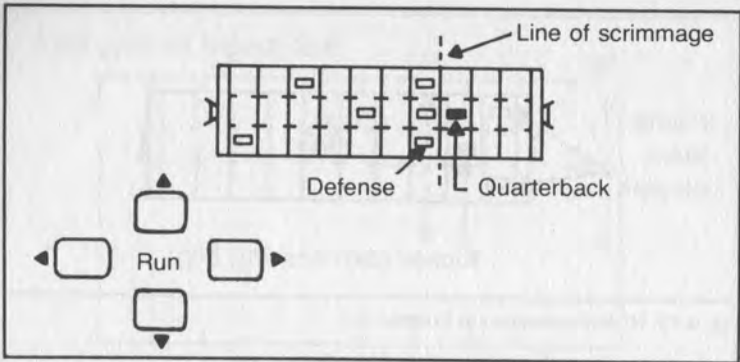


Fig. 9-13. Use of the run key in Football II.

Line of scrimmage

Receiver (dim flashing blip) Quarterback

Receiver

Receiver

Receiver

Receiver Path of ball

Receiver

If the pass key is pressed in this situation, the pass is incomplete (QB and receiver are not in the same lane).

If PASS is pressed now, the throw is intercepted (the defensive player in the pass lane has not come over the line of scrimmage).

If PASS is pressed now, the throw is intercepted (a second defensive player has moved into the pass lane, and is not yet over the line of scrimmage).

In this situation, the pass is completed, and the receiver can be directed with the run keys to run towards the left goal.

Here the pass *will* be completed (there is no defensive player between QB and receiver).

Fig. 9-14. Examples of passes in Football II.

Scores are as follows: a touchdown is 7 points, a field goal is 3 points, and a safety is 2 points.

WORLD CHAMPIONSHIP FOOTBALL

This highly sophisticated table top model (Fig. 9-15) from Mattel Electronics has a vacuum fluorescent display that shows realistically shaped, animated team members in color-coded jerseys. You can play against the computer or with another person. You have a choice of four skill levels. The computer allows you to make strategy decisions and call plays like real coaches do. An unlimited number of offensive plays may be programmed, including passes, handoffs, and laterals.

Players control the QB and program primary and secondary pass receivers on the five-men offense, by choosing one of five offensive formations. The player on defense controls the safety position, and programs the linebacker in a man-to-man alignment, adjusting the formation once the offense is positioned. The computer controls the two remaining defensive linemen and the two-man offensive line.

Pass interceptions, incomplete passes, fumbles, penalties, kickoffs, punts, and special defensive formations heighten the real-life excitement of this football game.

TANDY FOOTBALL

Football (Fig. 9-16) and Championship Football (Fig. 9-17), two games from Tandy (Radio Shack), offer features similar to those in the games already described. Bright and dim blips and flashing and stationary blips represent players and the moving ball.



Fig. 9-15. World Championship Football computerized football game (courtesy Mattel Electronics).



Fig. 9-16. Electronic Football computerized football game (courtesy Tandy Corp.).

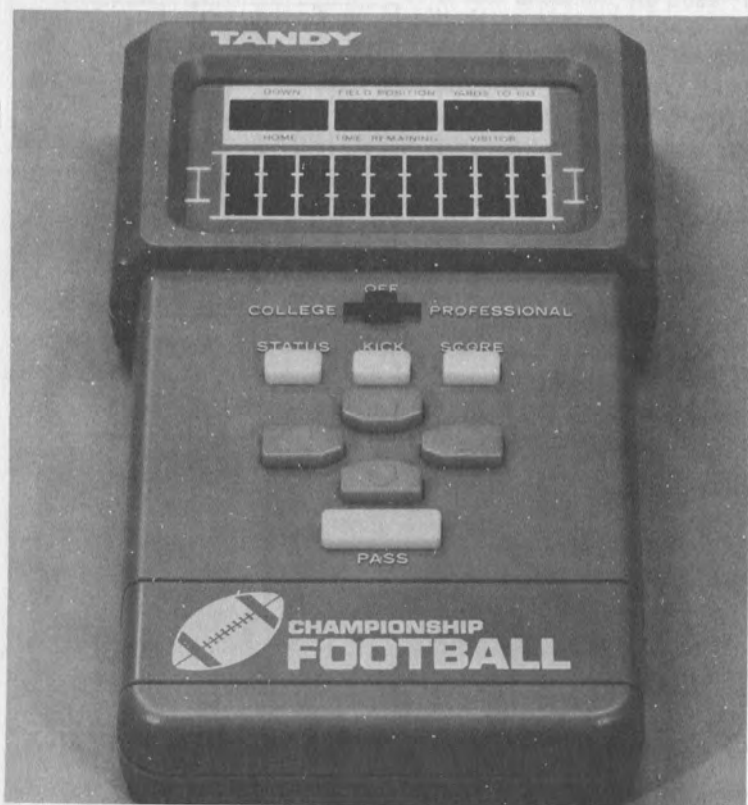


Fig. 9-17. Championship Football computerized football game (courtesy Tandy Corp.).

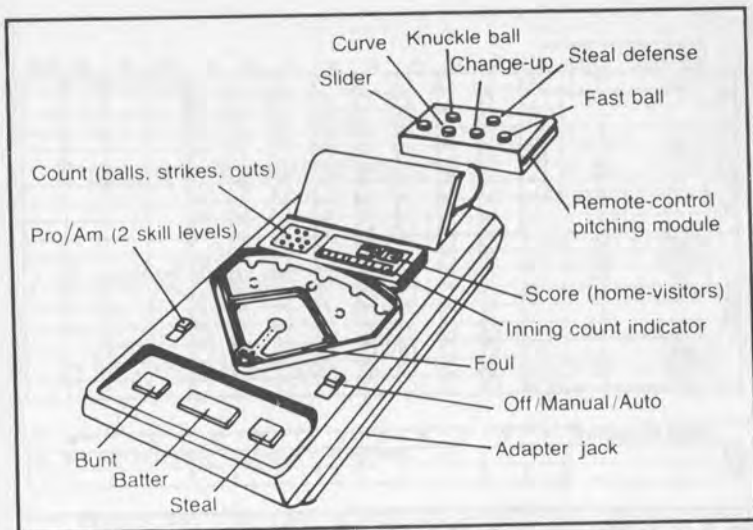


Fig. 9-18. Electronic Baseball 3 computerized baseball game from Entex Electronics.

BASEBALL 3

This exciting computer-controlled baseball game (Fig. 9-18) from Entex Electronics has the interesting feature that it splits into two parts to allow two players to compete against each other. A remote-control pitching component can be pulled away from the main unit so that your opponent can select pitches out of the batter's sight.

The pitcher can throw a number of pitches. The fast ball is a pitch that starts out fast and continues with a fast delivery. The change-up is a slow delivery. The curve ball is a slow delivery that curves to the left at the last second. The slider is another slow delivery but it curves to the right at the last second. The knuckle ball changes the action.

The steal defense button works manually only. When the team that's at bat has a man on first base who attempts to steal second base (by pushing the steal button). The pitcher can prevent the stolen base by pressing the steal defense button. If he reacts quickly, the runner is out. A slow reaction allows the runner to steal second base.

A hit is accomplished by pushing the bat button at the right time. You can bunt by pushing the bunt button.

Three other elements in the game are computer controlled: sacrifice fly, double play, and foul ball scoring.

Player		Pos	1	2	3	4	5	6	7	8	9	AB	R	H	RBI
V I S I T O R S			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
H O M E			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				
			X	X	X	X	X	X	X	X	X				

Score by Innings		1	2	3	4	5	6	7	8	9	R	H
V												
H												

Fig. 9-19. Scoring pad used with Baseball 3.

A special scoring pad allows you to keep score during the progress of the game (Fig. 9-19). Fill in fictitious names in the player column. In the position column, fill in the position numbers: 1 for the pitcher, 2 for the catcher, 3 for the first baseman, 4 for the second baseman, 5 for the third baseman, 6 for the shortstop, 7 for the left fielder, 8 for the center fielder, and 9 for the right fielder.

Outs are scored as 1, 2, or 3 for first, second and third outs. After the third out, draw a dark line under the last man at bat. Runners are tracked by darkening the base paths on the scoring pad, as shown in Fig. 9-20. As a runner proceeds around the bases, continue to darken the paths, recording his progress. In Fig. 9-21 player A's progress is recorded. Outs are recorded as shown in Fig. 9-22.

Getting on base is accomplished in one of five ways: base on balls, recorded as BB; single, recorded as 1B; double, recorded as 2B; triple, recorded as 3B; and home run, recorded as HR.

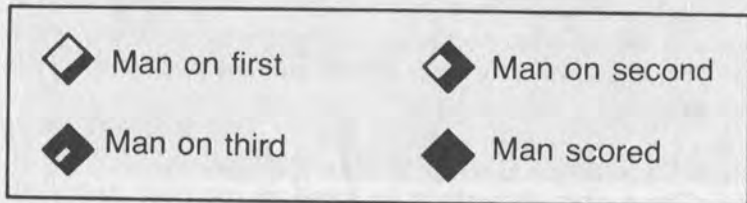


Fig. 9-20. Runners are tracked by darkening base paths in Baseball 3.





A singles	1 B 
B singles, A goes to second	1 B 
C walks, A goes to third	1 B 
D singles, A scores	1 B 

Fig. 9-21. Recording player A's progress.

Figure 9-23 illustrates a score for two innings for the visiting team. What has occurred? In the first inning player A has singled. B has flied out to right field. C tripled, scoring A. D flied out to left field, and, E grounded out to the shortstop. During the second inning, F led off with a walk. G doubled, advancing F to third, and player H struck out. Player I flied out to center field. A singled, scoring F and advancing G to third. B grounded out to first base.




1) Strike out: recorded as K	
Example:	K ①  —Struck out, first out
2) Fly out to outfielder: record as F with position number of outfielder catching the ball.	
Example:	F9 ②  —Flied out to right field, second out
3) Ground out in the infield: record as G with position number of infielder making the play.	
Example:	G6 ③  —Grounded out to shortstop, third out

Fig. 9-22. Recording outs in Baseball 3.

		Player	Pos	1	2
V I S I T O R S	A	6	1B	◆	1B
	B	5	F①9	◇	G③3
	C	2	3B	◆	◇
	D	3	F②7	◇	◇
	E	7	G③6	◇	◇
	F	8		◇	BB
	G	9		◇	2B
	H	4		◇	K①
	I	1		◇	F②8

Fig. 9-23. Using the scoring pad in Baseball 3.

LCD MIRACLE BASEBALL

This computerized baseball game (Fig. 9-24) from Bandai Electronics utilizes a remote-control pitcher's unit with six controls:

- The shift outfield players button lets you follow the path of the ball when it's hit and shift the outfield players to catch a ball that otherwise would have been a hit.
- The change-up button increases the speed of any other pitch button that is pressed.
- The inside curve ball button pitches balls and strikes.
- The straight ball button pitches all strikes, no balls.
- The outside curve ball button pitches balls and strikes.
- The stop steal button lets you cut off a steal by pressing this button immediately after the base runner begins to run, when you hear the steal sound.

Watch the pitched ball carefully and press the batter button when the ball reaches the hit zone. The direction of the ball varies according to when the batter button is pressed. When you use the bunt button, the same timing is required as when you use the batter button. An early bunt attempt sends the ball down the third base line, while a late attempt moves the ball along the first base line. You can steal by pressing the steal button shortly after the ball leaves the pitcher's mound. A late start makes it easy for your

opponent to cut off the steal when he or she hears the base runner sound.

The scoreboard indicates the following:

- The count indicator gives you the count (strikes, balls, and outs) and the number of outs.
- The inning indicator shows what inning the game has progressed to.
- The team at bat indicator shows which side is on offense.
- The score indicator shows the number of runs scored by the team at bat for the current inning only.

When you are the batter the ball is hit only if you press the button to coincide with the ball's entry into a black dot zone, while the outcome of your hit is determined by the timing of your hit within that black dot zone. There are seven different outcomes when you hit the ball to any infielder except to the pitcher. Five different possibilities can occur when you hit a ground ball to the pitcher. The game can be played in a two-player or one-player mode.

ELECTRONIC BASEBALL

This game (Fig. 9-25) from Tandy Corp. can be played in a one-player or two-player mode. In the one-player mode, the com-

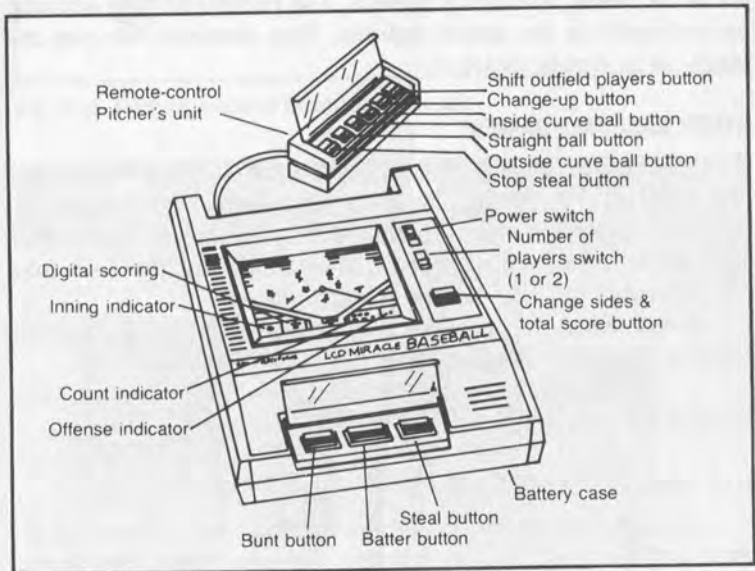


Fig. 9-24. LCD Miracle Baseball computerized baseball game.

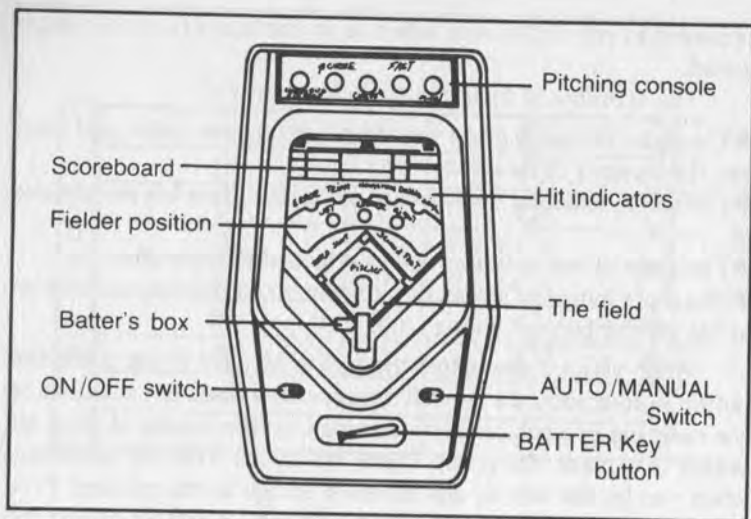


Fig. 9-25. Electronic Baseball game from Tandy Corp. (Radio Shack).

puter randomly selects one of the following pitches: left or right curve ball or slow or fast straight ball. When you start pitching two LED lights appear, one on the pitcher's mound and one in the batter's box. Press the batter key at the right moment as the ball approaches the batter's box (Fig. 9-26). If you hit the ball, lights will circle the bases, simulating runners. The runners on base advance automatically as the action requires. Play continues for nine innings, as in regular baseball.

OTHER BASEBALL GAMES

Mattel Electronics' baseball game is called World Championship Baseball (Fig. 9-27). This game has a sophisticated computer that lets you choose from a 15-man, or regular 9-man, roster. Full statistics help you to make a decision with the computer's aid. You can also substitute players and replace pitchers.

Talbot Electronics makes 2-Player Baseball, with separate pitching controls and sound effects.

Entex Industries has Hip Pocket Baseball (Fig. 9-28), a miniature game that uses a lever to cock pitches.

ELECTRONIC BASKETBALL 2

Proaction, full court, realistic basketball with controlled offense and defense, passes, dribbles, lay-ups, jumps, set shots, rebounds, and turnovers are all part of the fast and furious

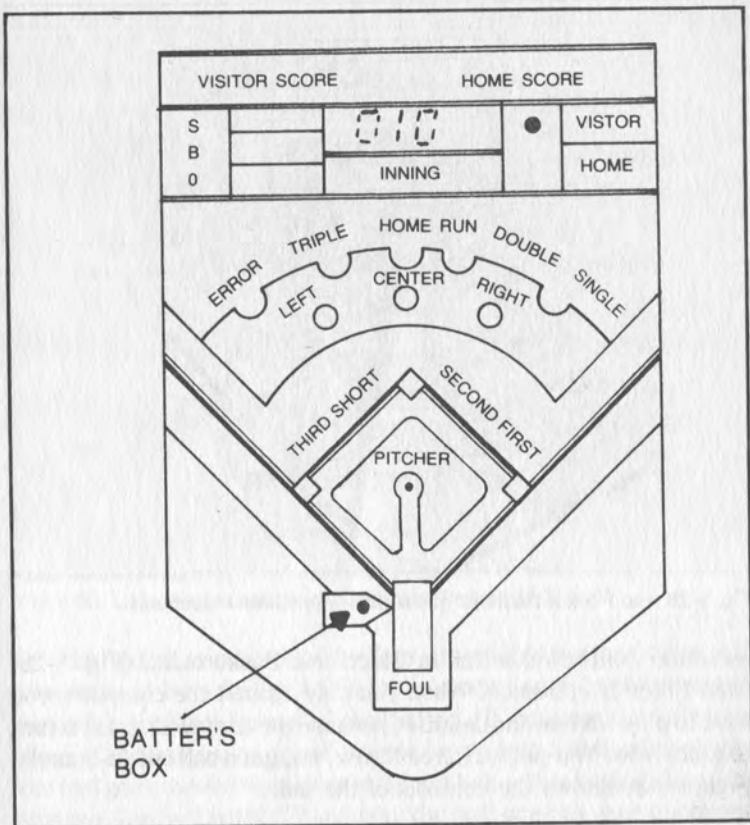


Fig. 9-26. Pitching mode of Electronic Baseball.

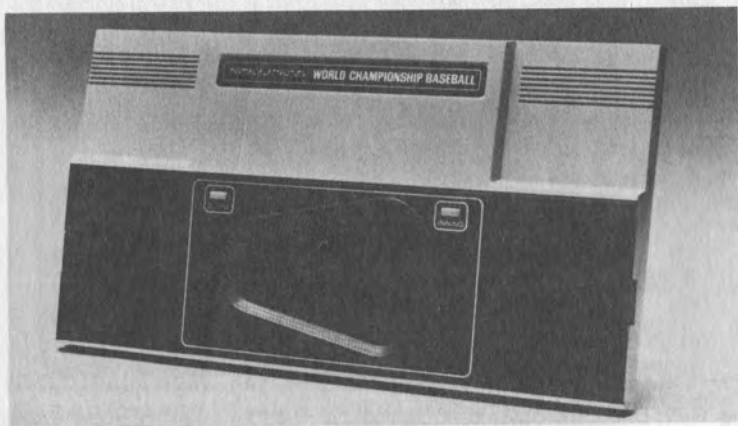


Fig. 9-27. World Championship Baseball game (courtesy Mattel Electronics).

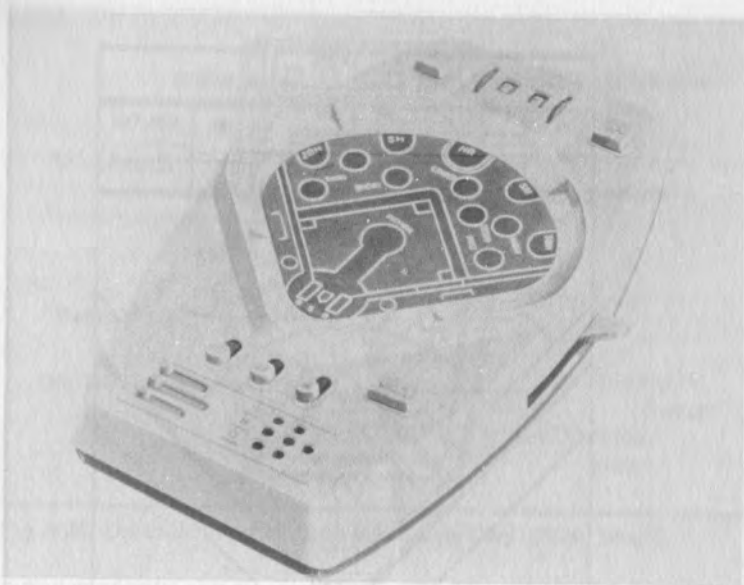


Fig. 9-28. Hip Pocket Baseball game (courtesy Entex Industries).

computer-controlled action in Electronic Basketball 2 (Fig. 9-29) from Entex Electronics. When you play against the computer you have to play offense and defense, because the computer gets its turn to score, too. You can foul, free throw, and get a ball out-of-bounds. Figure 9-30 shows the controls of the unit.

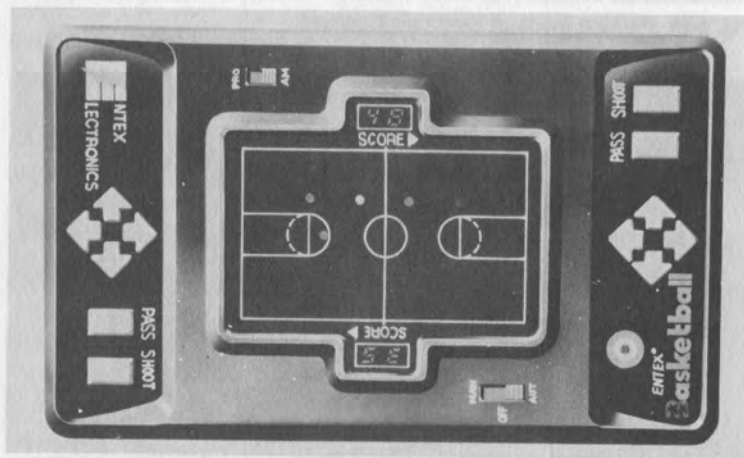


Fig. 9-29. Electronic Basketball (copyright © 1980 by Entex; courtesy Entex Electronics).

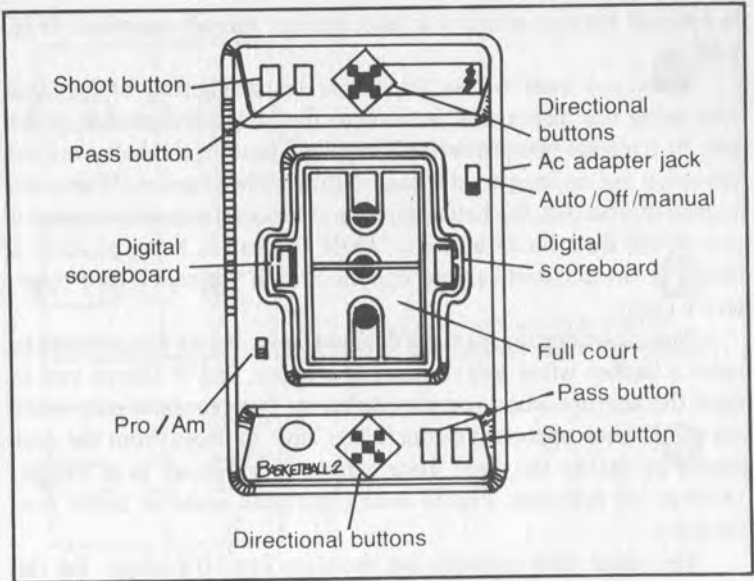


Fig. 9-30. Layout and controls of Electronic Basketball 2.

Dribbling is controlled by four directional buttons. The ball, represented by a bright LED, travels one space in the direction indicated for each press of the button. If you are the offensive player, and you move out-of-bounds or run into a defensive player, the ball goes to your opponent at a point behind his basket. If you fail to move the ball within 3 seconds, the ball goes to your opponent. When the ball is in the offensive court, the defense has one man, represented by a dim LED (Fig. 9-31).

Once you enter the defensive court, two guards appear. They pivot around the basket to keep you from getting close to the basket. The movement of the guards is controlled by the left and right

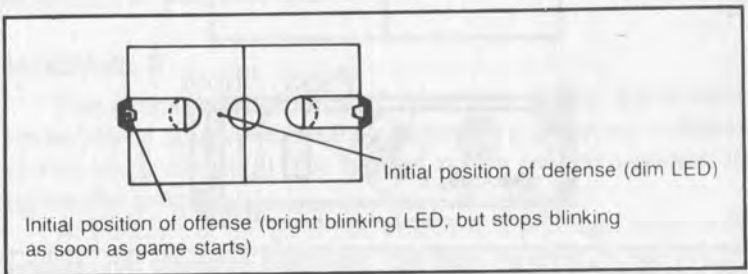


Fig. 9-31. Each time a basket is scored or turnover occurs, this configuration is displayed. Offense must move within 3 seconds or lose control.

directional buttons when you play against human opponent (Fig. 9-32).

When you want to pass, you press the pass button, at the same time using the directional buttons to direct the movement of the ball. At the time you press the directional button, the ball goes out and stays out as long as the pass button is held down. When you release this button, the ball reappears at the spot you maneuvered it to with the directional buttons. While the ball is being passed, it cannot be intercepted by your opponent until you reach your opponent's court.

The shoot button serves a dual purpose. It lets you attempt to make a basket when you're playing offense, and it allows you to block the attempt when you play defense. You can shoot only when you are in your opponent's court. You have to shoot from the area around or inside the key. Your attempt can result in a basket, turnover, or rebound. Figure 9-33 illustrates some of these possibilities.

The game also features the shooting foul. If a player for the offense attempts a shot and one of the defensive guards runs into him within $\frac{1}{2}$ second after the ball is released, a shooting violation occurs, and two free throws are awarded. The free throw feature allows you a free throw. Another feature of this game is the dummy player. When you, as the offensive player, enter the defensive

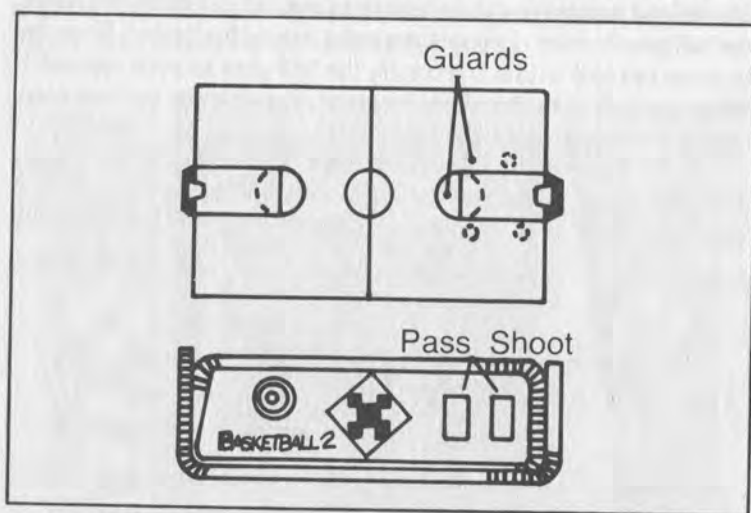


Fig. 9-32. When the offense crosses the center line, the defense man disappears and two guards appear. The outlined points indicate positions they occupy. Their movement is controlled by the right and left directional buttons only.

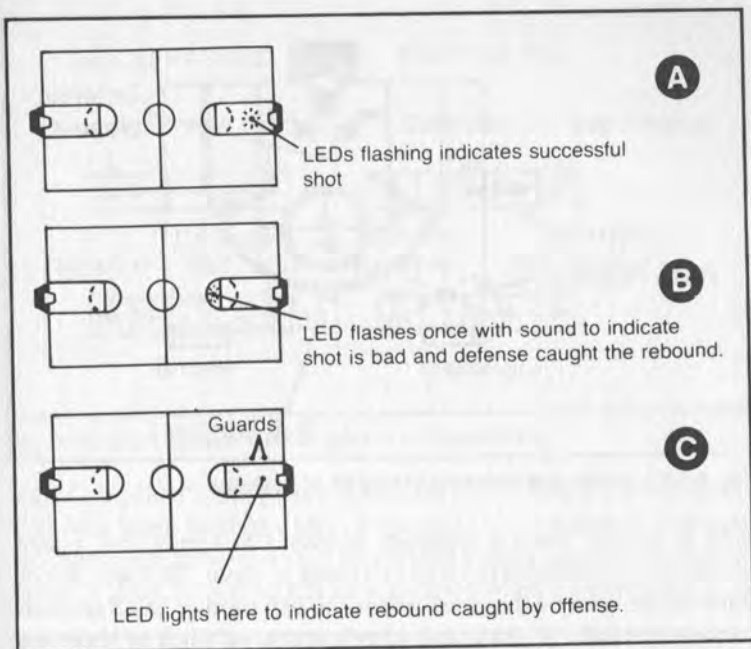


Fig. 9-33. Shooting possibilities. (A) If shot is successful two LEDs flash twice with sound. The ball then goes to your opponent. (B) If the shot is bad, an LED at the free throw line flashes once with sound, and the ball goes to your opponent. (C) If you attempt a shot from around or inside the key and your opponent blocks the shot, you get the rebound and can shoot again. If you don't shoot or move within 3 seconds, your opponent gains control of the ball.

court, a dummy offensive man (indicated by a dim LED) appears to throw off the defense. His position is controlled by the computer, but he will always be located on the opposite side of the court from you, the man with the ball. The back court violation means that once you, as the offensive player, enter the defense's court, you cannot move back to your own court.

BASKETBALL 2

This computerized basketball game from Mattel Electronics can be played at four different speed levels: high school, college, all-star, and professional. You can play against another opponent or against the computer.

At the start of the game the brightest blip of light is the ball handler. His offensive teammate, the pass receiver, is the bright flashing blip (Fig. 9-34). The five dimmer blips are defensive players controlled by the computer. Each team controls the ball

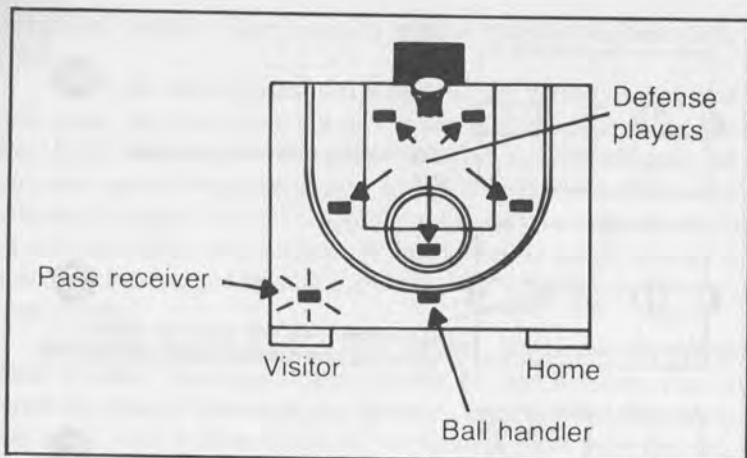


Fig. 9-34. Location and indication of players of Basketball 2.

until it scores, loses a rebound, throws a bad pass, has a shot blocked by the defense, or waits too long to shoot. The orange key outlines the area on the court where the ball handler has 3 seconds to pass the ball. A clock and scoreboard keep track of time and scores.

When you play against another opponent, this opponent has the use of three defensive strategy keys. The MAN option allows two players for the defense to guard the ball handler, while their three teammates stay in zone formation. If ZONE is used, all defenders stay in their respective zones and guard the ball handler at those locations. PRESS causes four defenders to gang up on the ball handler, while the fifth defender guards the pass receiver. The offense uses four directional keys to direct the movement of the ball handler.

Passing is the name of the game. You can pass when the passer and receiver are in the same row or diagonal line and not more than one defender is next to the passer in the path of the ball (Fig. 9-35).

There are three kinds of scoring in this game (Fig. 9-36): 3-point baskets, which are shot from any of the five spots, 2-point baskets to be made from twelve places, and 1-point foul shots or free throws taken from the foul line. To score a basket from the court, you must press SHOOT when the ball handler is in scoring position, and there are no defending players between the shooter and the basket.

The game has a number of sound effects. One whistle indicates a personal foul has been committed by the defense, and two whistles

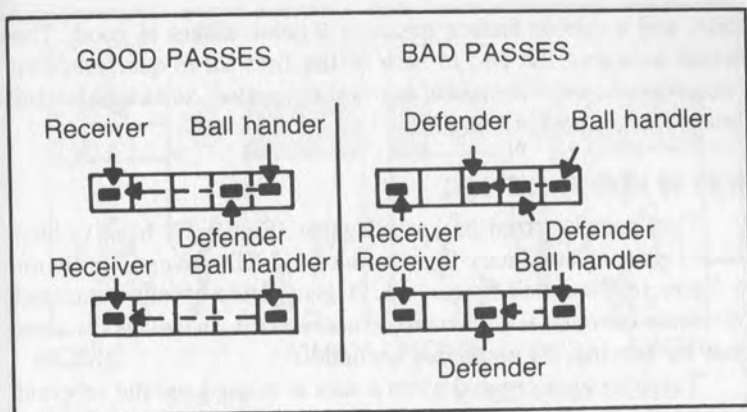


Fig. 9-35. Good passes and bad passes in Basketball 2.

signal a blocked shot or pass, the ball is out-of-bounds, or too much time was taken without a shot. If you hear three whistles, it means too much time inside the key. A two-note fanfare sounds when a free throw is good, a four-note fanfare is heard when a 2-point basket is

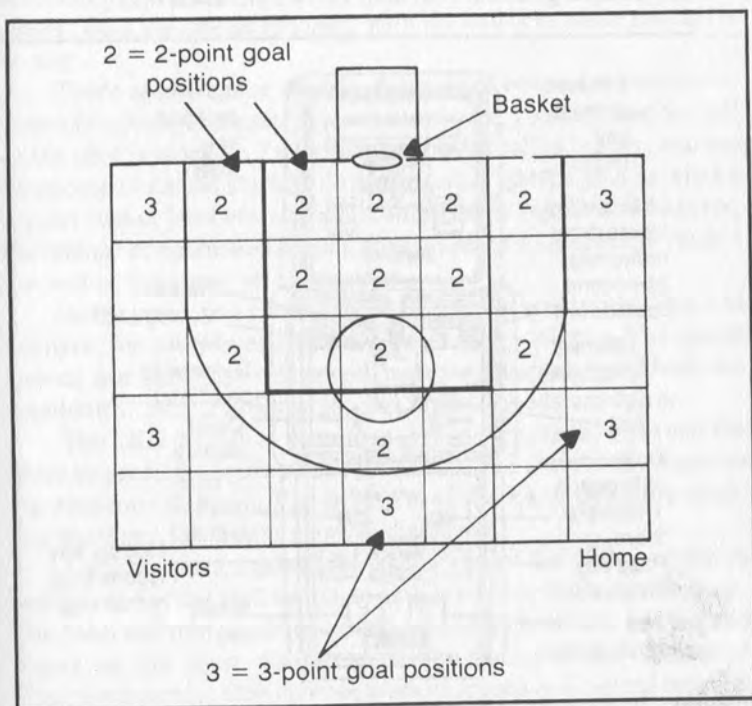


Fig. 9-36. Scoring possibilities in Basketball 2.

good, and a double fanfare means a 3-point basket is good. The buzzer indicates the end of each of the first three quarters, two buzzers are heard at the end of an overtime period, and a long buzzer means it's the end of the game.

HEAD TO HEAD BASKETBALL

This computerized basketball game (Fig. 9-37) from Coleco Industries uses stationary figures, but the LED moves from figure to figure to show ball movement. A game time of four simulated 15-minute quarters is shown on the scoreboard, as well as the time limit for scoring, 24 simulated seconds.

Turnovers are created when a shot is missed and the rebound is caught by the defense, a shot is blocked by a defense man, a pass is intercepted by the defense, the 24-second time has run out or the quarter is over. You have to play very good offense, because a missed basket results in a rebound. As illustrated in Fig. 9-38, shots by players 1 and 5 rebound toward player 3, shots by players 2 and 3 rebound toward player 5, and a shot by player 4 rebounds to player 4. If the offense gets the rebound, there's no turnover.

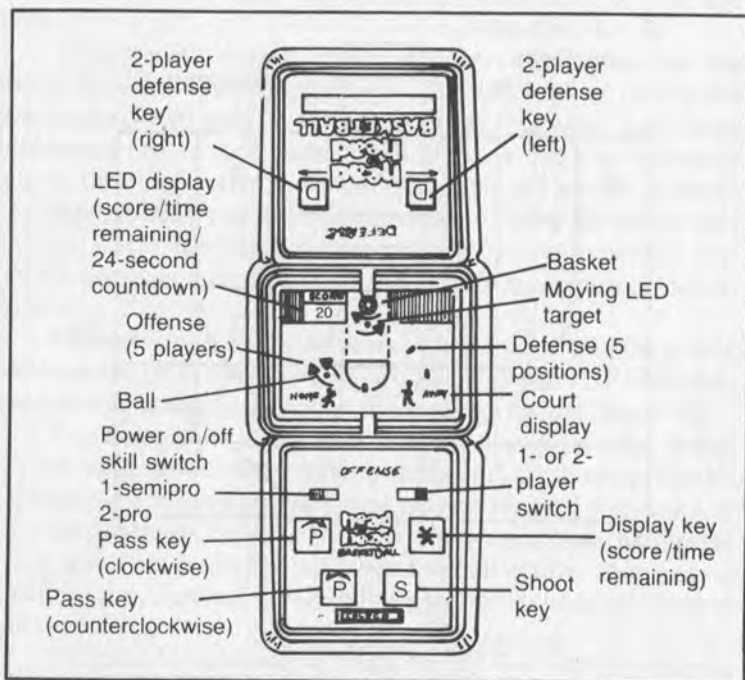


Fig. 9-37. Head to Head Basketball layout and controls.



Fig. 9-38. Rebounds in Head to Head Basketball.

You can pass between only two players at a time. A moving series of lights marks the path of the ball as it goes from player to player. Only the offensive player with the ball is lit while the ball is in play.

There are six game sounds. A series of beeps denotes movement of the ball. The buzzer means a turnover; you have lost the ball or the shot is blocked. Ticking indicates the ball is in play, and the 24-second clock has started. A triple musical whistle sounds when a 2-point basket has been scored. A single beep signals a rebound by the offense or defense. The long musical whistle series tells you it's the end of the game or the quarter.

In this game, you can choose between two skill levels. Skill 1 is semipro, for one player only, you play for the defense. The target speeds are slow but the speed increases during the 24-second countdown. Skill 2 is for pros, and target speeds are faster.

The LED display is ingenious. When play stops, you read the score by pressing the display key (*) once. The score is displayed in the sequence shown in Fig. 9-39. Press the * key one more time, and the Time left in the game is displayed.

To play a game against the computer, set the player switch to position 1. Set the skill switch to skill level 1 or 2. The game is on. The team starting on offense (home or away) is shown as a lighted player on the court display at the beginning of the 24-second countdown period. One defense player appears as a lighted bar, and one LED target appears near the basket (Fig. 9-40).

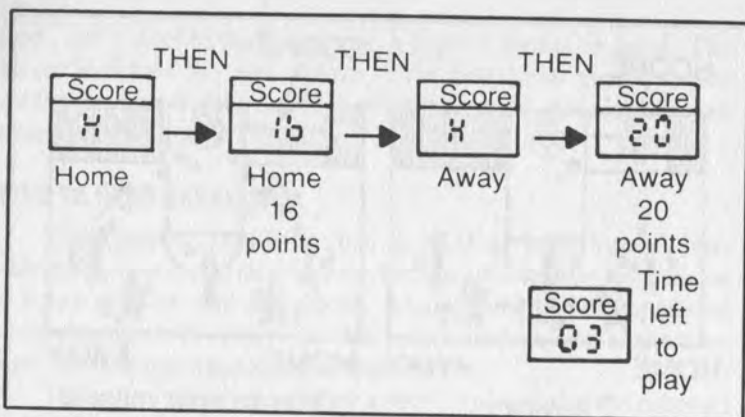


Fig. 9-39. LED display sequence in Head to Head Basketball.

When you are ready to play, you must first press and hold down either pass key and then press the display key (*) momentarily. Maneuver the ball among players 1 through 5 by pressing the pass keys. The 24-second clock has now started. Defensive players A through E flash on one at a time for a random time and duration. The moving LED target quickly moves back and forth in front of the basket.

Press the shoot key (S) to attempt a basket from a lighted player position. In order to score, you must time your shot to intersect the LED target and avoid being blocked by a lighted defense player. If you score, the basket lights up, and a triple

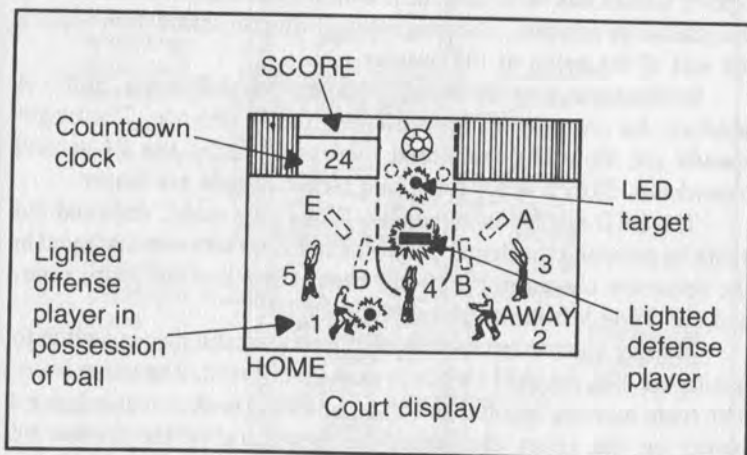


Fig. 9-40. Court display at the beginning of a game against the computer in Head to Head Basketball.

musical whistle is heard. Use the display key (*) to read the score and time remaining. If your shot intersects a lit defensive player, the shot is blocked, and a turnover occurs. A shot may be made by any offensive player; however, a shot taken from player 1 or 2 is always made through players 5 or 3, respectively. Timing your shot is always more difficult when taken from players 1 or 2. Continue playing the game in this manner.

HEAD TO HEAD SOCCER

Coleco Industries' computerized soccer game (Fig. 9-41) has a setup similar to Coleco's Head to Head basketball game. In soccer, you have a different number of players, you have to kick the ball rather than throw it, and the basket is a goal defended by a goalie.

The game time on the scoreboard has two simulated 45-minute halves. The game stops at the end of each half, and a turnover occurs. Scoring is 1 point for each goal. A goal is scored when a shot is taken at the goal, and it is not blocked by a defense man or goalie. The goal lights up for a score, and a score sound is heard. There is a

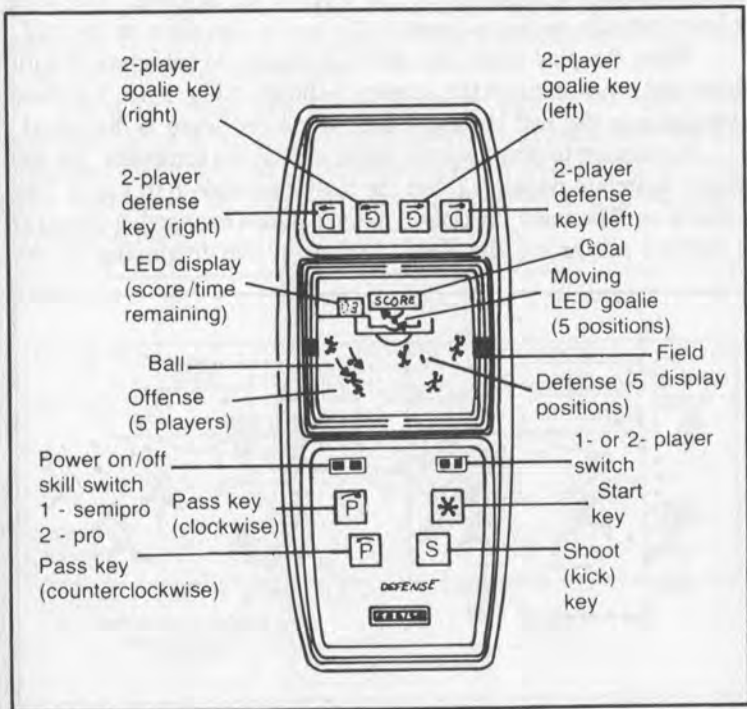


Fig. 9-41. Head to Head Soccer from Coleco Industries.

time limit for scoring; you have a limited time to score in each skill position. Skill level 1 allows twice the time to score as level 2.

You stay on offense until a score is made, a pass or shot is blocked or intercepted by the defense, a rebound is taken by the defense, the time runs out, or the half has ended. You can pass between only two players at a time. A moving series of lights marks the path of the ball between players. Only the offensive player with the ball is lit during play. A shot at the goal can only be taken from players 3, 4, or 5 (Fig. 9-42).

The goalie is the defender of the goal, and a shot blocked by him results in a rebound. A shot by player 5 rebounds towards player 3, a shot by player 3 rebounds towards player 5, and a shot by player 4 rebounds back to player 4.

This computerized soccer game has six game sounds. A series of beeps denotes movement of the ball. The buzzer means a turnover. You have lost the ball or shot is blocked. Ticking indicates that the ball is in play, and the countdown clock has started. The triple musical whistle sounds when a goal has been scored. A single beep indicates a rebound by the offense or defense. The long musical whistle series is heard at the end of the game or the half.

When the play stops, the score is displayed automatically for home and away teams in the sequence shown in Fig. 9-43. The time remaining in the half is shown after the away score is displayed.

If you want to play a soccer game against the computer, Set the player switch to position 1. Set the skill level switch to 1 or 2. The game is on. The team starting on offense (home or away) is shown as a lighted player on the field display at the beginning of the

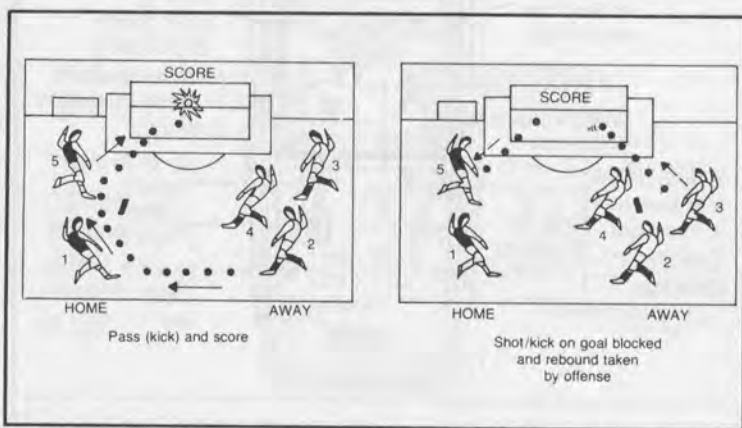


Fig. 9-42. Passing, kicking, and rebounding in Head to Head Soccer.

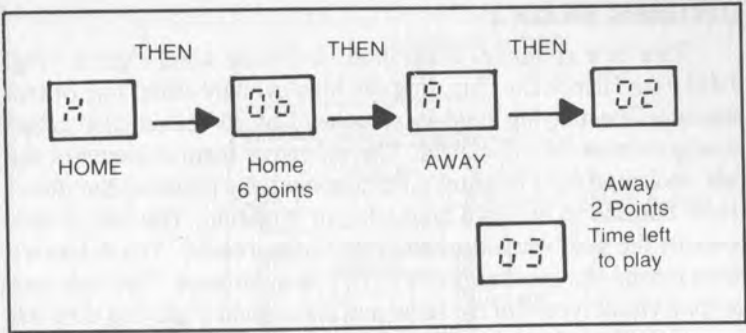


Fig. 9-43. LED display sequence in Head to Head Soccer.

countdown period. One defense player appears as a lighted bar and the goalie appears near the goal (Fig. 9-44).

When you are ready to play, press the start key (*). Maneuver the ball among the players by pressing the pass keys. The countdown clock has started. Press each pass key only once for each pass. Take a shot at the goal from players 3, 4, or 5. Defensive players A through E will flash on one at a time for a random time and duration. The goalie moves quickly back and forth in front of the goal, following the ball in play.

Press the shoot key (S) to shoot or kick at the goal from position 3, 4, or 5, when you have a clear shot. If you score, the 0 in the score lights up, and the triple musical whistle sounds. If your shot intersects a lit defensive player, the shot is blocked, and a turnover occurs.

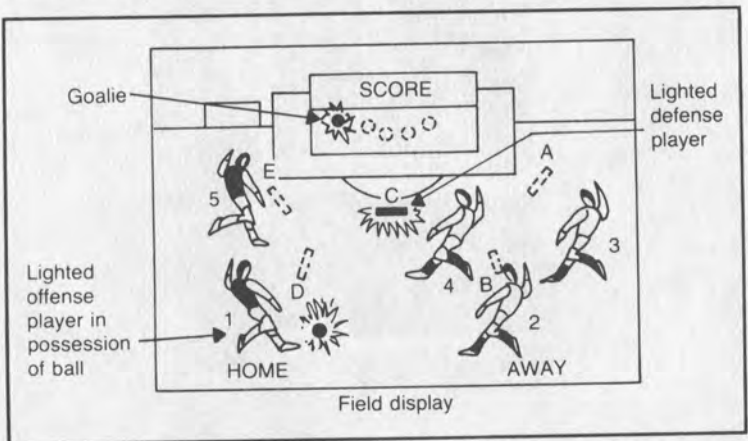


Fig. 9-44. Field display at start of play; you are playing the computer in Head to Head Soccer.

ELECTRONIC SOCCER 2

This is a computer-controlled electronic soccer game (Fig. 9-45) from Hirsch Co., Inc. that can be played by either one or two players. The playing field is composed of 40 rectangular lamps arranged in an 8-by-5 matrix. The offensive team maneuvers the ball, indicated by a brighter LED segment, by pressing the directional buttons to set up a goal attempt situation. The ball is shot towards the goal when the shoot button is pressed. The defensive team moves the goalkeeper to save a goal attempt. The unit also keeps a visual record of the score and the amount of playing time left in each half of the game. You can play in either the amateur or professional mode.

To play a two-player game, move the player control switch to control the speed of your game (Fig. 9-46). Push either the forward, left, or right directional button to begin the action. There are two

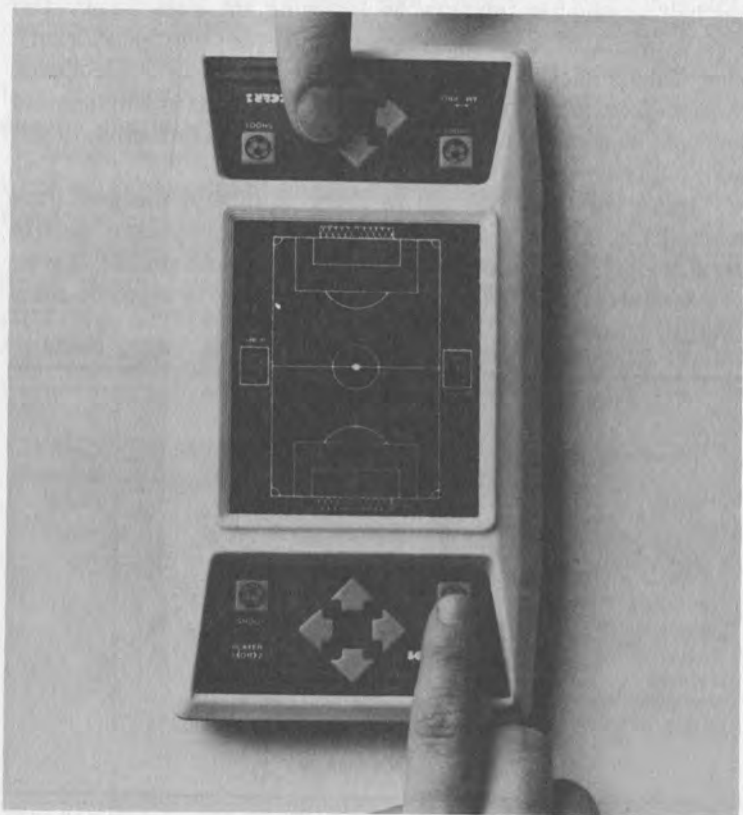


Fig. 9-45. Electronic Soccer 2 (courtesy Hirsch Co., Inc.).

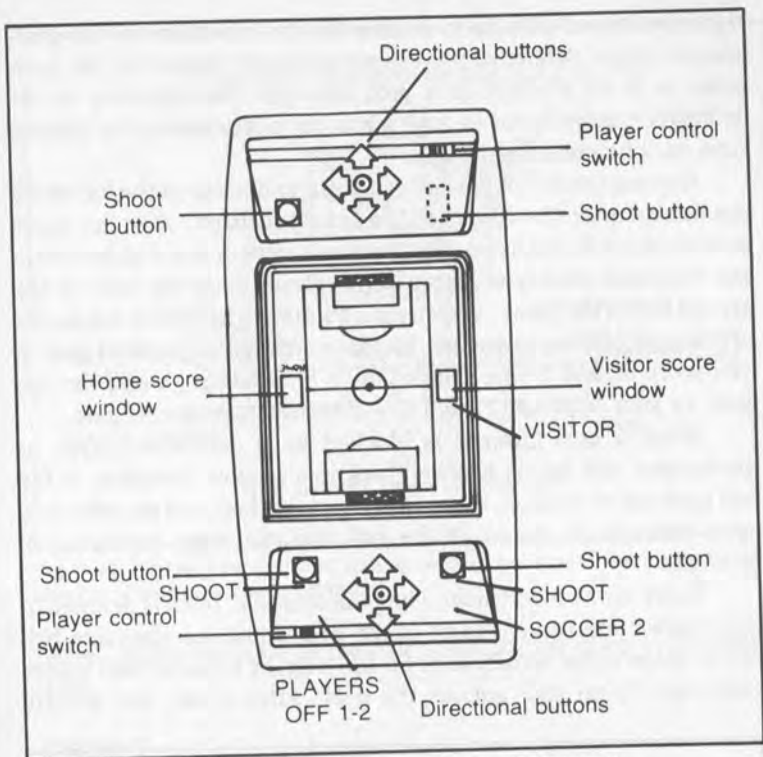


Fig. 9-46. Playing a two-player game with Electronic Soccer 2.

teams, the visiting team and the home team. The visiting team makes a move and is in possession of the ball. Maneuver the player holding the ball in any direction within the boundaries of the playing field. Other men on the playing field are controlled by the computer and move randomly. The player that has the ball cannot move into a space occupied by any other player. When the player holding the ball has an opportunity to make a goal attempt, that player should press one of the shoot buttons. The ball shoots directly at the goal. From the left or right side columns, the ball shoots at an angle of 45 degrees. The player holding the ball should not stay in the penalty zone too long, or he will be penalized and lose control of the ball. If a goal attempt is successful, the unit salutes the player with a series of electronic sounds, and the score is displayed in the visitor and home windows. The opposing side gains possession of the ball immediately. If the visiting team does not score or is not penalized within the 8-minute playing segment, the opponent gains control of the ball automatically. The defensive team can use only the left or

right directional buttons to control the five positions of the goalkeeper. Other defensive players are randomly moved by the computer to block the ball or a goal attempt. The objective of the defensive player is not to lose a goal for a fixed period of playing time until he controls the ball.

Gaining control of the ball can occur under one of the following conditions: after the opponent has been penalized, after the opponent scores, when the opponent does not score or is not penalized in any 8-minute playing segment in the game, or at the start of the second half of the game. Within each 45-minute half there is a series of 8-minute playing segments. You have 8 minutes to score a goal. If you score or foul before the end of an 8-minute segment, the ball goes to your opponent, and a new 8-minute segment begins.

When a goal attempt is blocked by a defensive player or goalkeeper, the ball is bounced back in a random direction. If the ball goes out-of-bounds, it is called an outside ball, and the offensive team remains in control of the ball and can make another goal attempt.

There are two occasions when the offensive team is deemed to have fouled and loses control of the ball: when the offensive ball holder stays in the penalty zone for too long, or when the ball holder makes an illegal shot outside the goal.

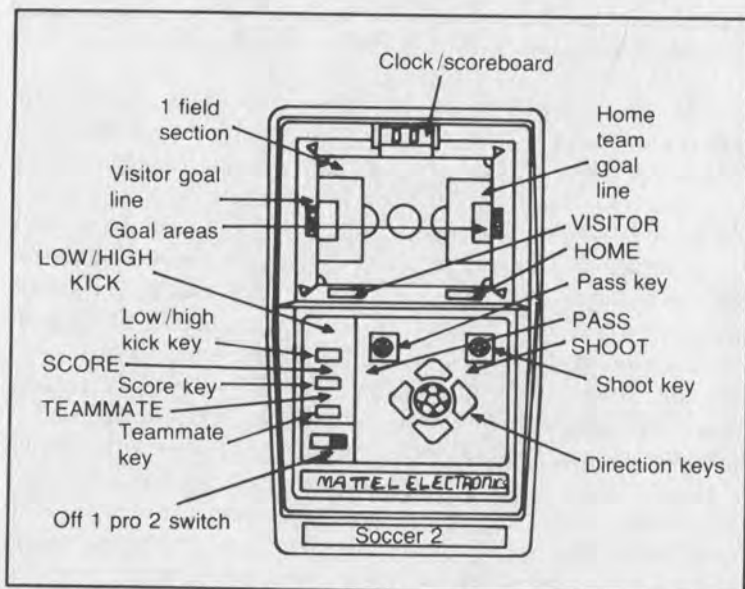


Fig. 9-47. Soccer 2 computerized soccer game from Mattel Electronics.

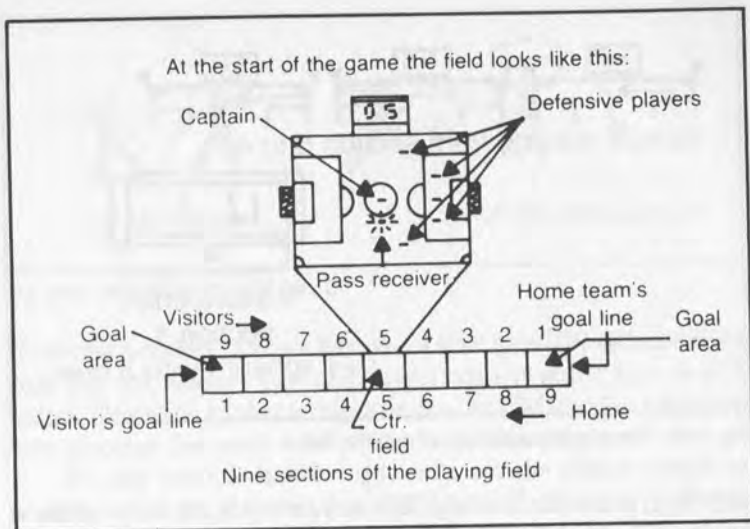


Fig. 9-48. Soccer 2 playing field as it appears at the start of the game and the division of field into nine sections.

blows, and possession of the ball automatically goes to the other team.

SOCCER 2

Mattel's Soccer 2 (Fig. 9-47) is a 1- or 2-player game. The playing field consists of nine sections. You can see only one section at a time (Fig. 9-48). The scoreboard tells you which section you're playing in at any time. As the ball moves from one section to another, the section number changes, and the scoreboard tells you where you are. When the offense enters the section at either end of the field, the scoreboard displays a dash (—) to warn you that you are in the goal area (Fig. 9-49).

The brightest blip of light on the field is the player you control who has possession of the ball. Your offensive teammate is the pass receiver, a slow blinking bright blip. The five dimmer blips are defensive players controlled by the computer. When the game starts the visitors have the ball. Each team controls that ball until it scores, kicks out-of-bounds, runs out of time in the half, or has the ball stolen or kicked away by the defense.

Kickoff formation (Fig. 9-50) appears after a goal and at the start of each half. As in real soccer, there are throw-ins, balls that have gone out-of-bounds. There are 14 throw-in formations. There are also corner kicks, just as in real soccer. If you want to make a

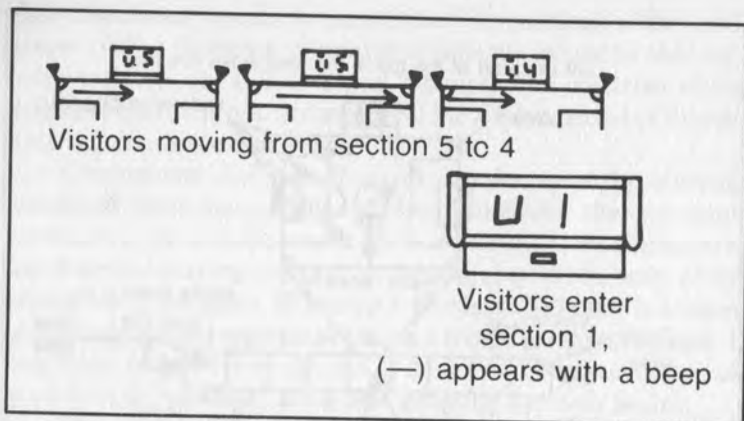


Fig. 9-49. Scoreboard indication of moving ball.

high kick, press the low/high kick key, and you can make either a low or high pass. Your kick can also be blocked (Fig. 9-51).

The game has nine sound effects. The ticking sound means the ball is in play, and the clock is running. The beeping tone signifies a loose ball. You'll hear the whistle when the defense steals the ball, or the ball is out-of-bounds. There is a special tune when a goal is scored. A beep means the offense is in section one or teammate controlled. A high tone denotes a high shot and high pass, and a low tone indicates a low shot and low pass or that the defense has kicked the ball away. The double whistle means it's the end of the half, and the triple whistle signifies the end of the game.

HEAD TO HEAD HOCKEY

In this computer controlled hockey game (Fig. 9-52) from Coleco Industries, the offense has a clockwise and counter-

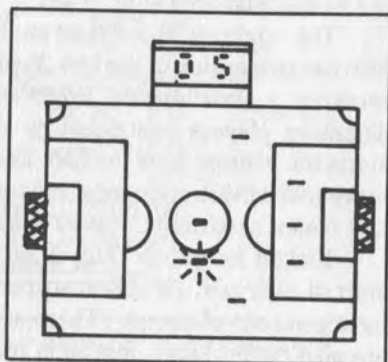


Fig. 9-50. Kickoff formation in Soccer 2.

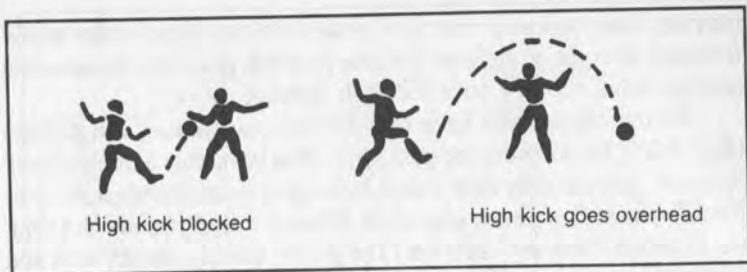


Fig. 9-51. High kicking in Soccer 2.

clockwise pass key, a shoot key, and a start key. The defense has a right and left defense key, and a right and left goalie key. A skill switch allows you to play semipro or pro. An LED display automatically displays the score for both teams after each play.

To play against another opponent, set the player switch to position 2. Set the skill switch to skill 1 or 2. The game is on. Press the start key (*) to begin the action. Your opponent the defense, is positioned at the defense end and has the use of two defense and two goalie keys. Your opponent can move the defense man, a lighted bar, back and forth to block your shots by pressing and holding either defense key. Once a key is released, the defense man stops

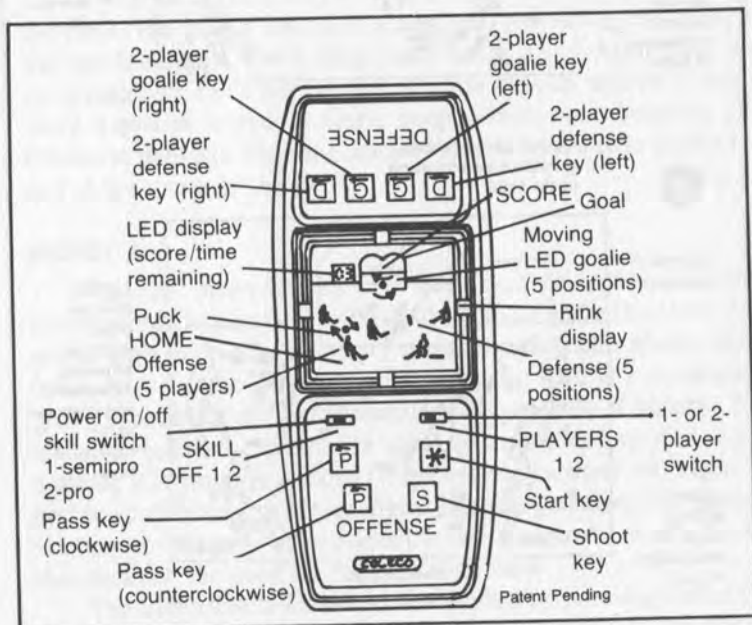


Fig. 9-52. Head to Head Hockey from Coleco Industries.

moving. Your opponent can also move a defense man or the goalie from left to right or right to left one position at a time by pressing and releasing the key once for each defense move.

As the offense you have to move the puck among the players (Fig. 9-53), by pressing the pass keys. You have only a limited time to score. You can only take a shot at the goal from players 3, 4, or 5. Your opponent's defense players A through E flash on one at a time for a random time and duration. The goalie quickly moves back and forth in front of goal, following the puck in play. When the goal is not blocked by a defensive player and goalie is out of position, use your shoot key to take a shot at the goal.

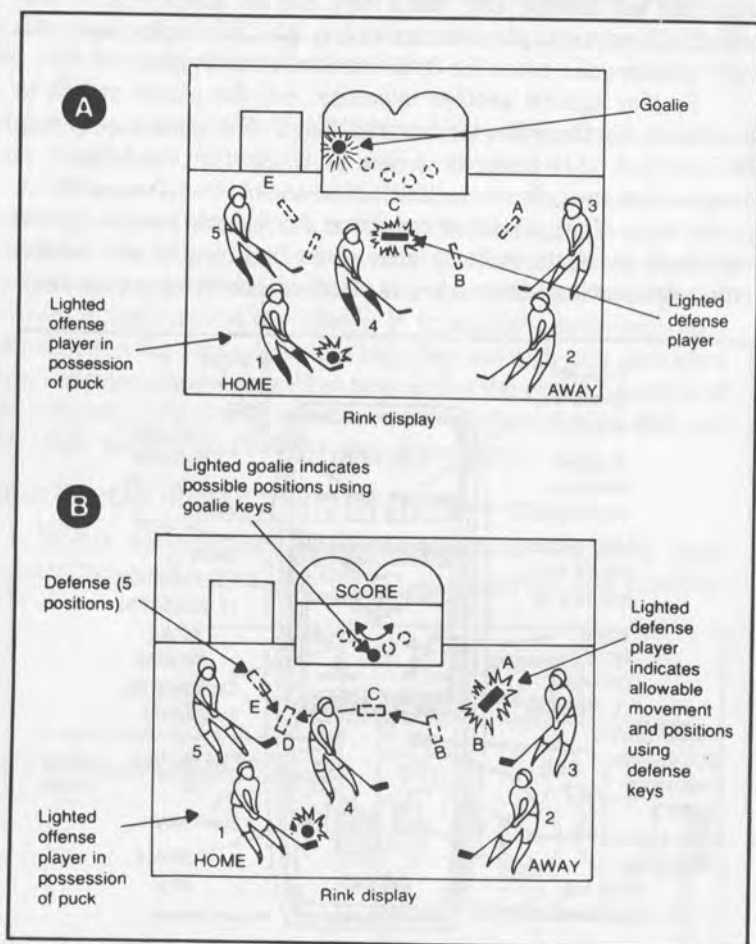


Fig. 9-53. Offensive (A) and defensive (B) play in Head to Head Hockey.

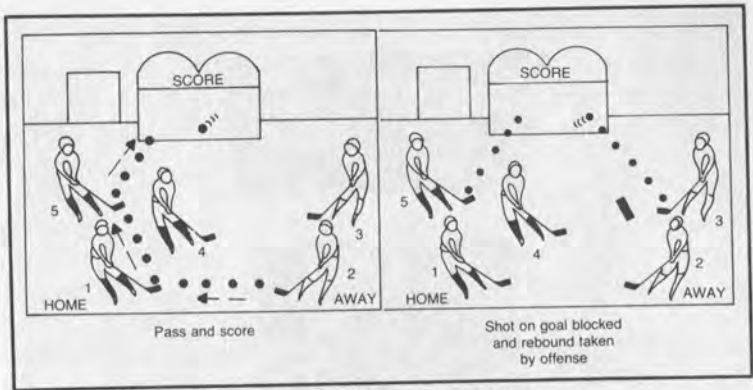


Fig. 9-54. Passing and shooting in Head to Head Hockey.

You can move the puck between two players at a time. A moving series of lights marks the path of the puck (Fig. 9-54). Be careful of rebounds. A shot by player 5 rebounds toward player 3, a shot by player 3 rebounds toward player 5, and a shot by player 4 rebounds back to player 4. A turnover occurs when the shot is blocked by your opponent's defense, intercepted by the defense, or a rebound taken.

Listen for the sounds. A series of beeps denotes movement of the puck. The buzzer indicates a turnover; you've lost the puck, or the shot is blocked. The ticking sound means the puck is in play, and the countdown clock has started. A triple musical whistle is heard when a goal is scored. A single beep indicates a rebound by the offense or defense. The long musical whistle series tells you its the end of the game or the period.

HOCKEY 2

This unit from Hirsch Co., Inc., is a computer-controlled electronic hockey game (Fig. 9-55) that can be played by either one or two players. In the one-player game, the computer always plays defensively for the home team. The playing field is a rectangular grid composed of 40 rectangular lamps in an 8-by-5 Matrix. The offensive team maneuvers the puck by means of four directional buttons, allowing the puck to be moved in a forward left, right, or backward direction to set up a goal attempt position. The puck is shot toward the goal when one of the two shoot buttons is pressed; they can only be used by the offensive team.

The defensive team moves the goalie, by pressing either the left or right directional button, to save a goal attempt. The defen-

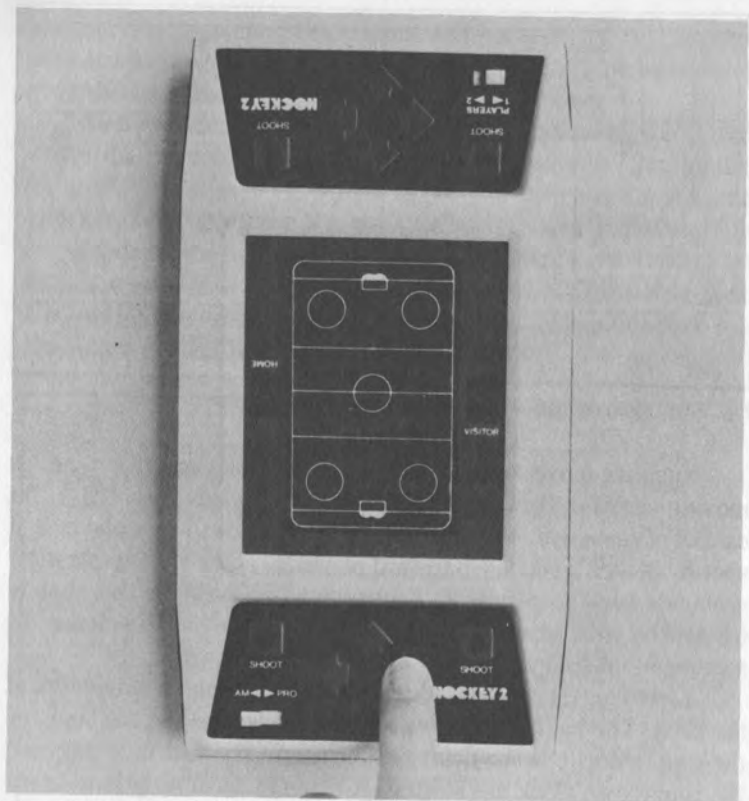


Fig. 9-55. Hockey 2 from Hirsch Co., Inc. (courtesy Hirsch Co., Inc.).

sive team gains control of the puck when the offense stays in the penalty zone too long, after a score, or when the offense does not score.

Scores are indicated in the display window, and sound effects accompany the play.

COMPUTER BOWLING

This computer bowling game from Vanity Fair is a blend of the latest in microcomputer technology and electromechanical design (Fig. 9-56). The game is designed for either one or two players and simulates the conditions of actual bowling. Total ball control allows you to throw straight balls, hooks, or slices. The computer automatically responds with digital scoring, animated displays, and corresponding sound effects.

In the one-player mode, the digital display shows zero for player one only, and the frame counter indicates frame one. When set in the two-player mode, the digital display shows zero for both players. The computer automatically scores for both players in each frame.

When the game is turned on, 10 illuminated pins appear at the far end of the display screen. At the opposite end of the main display an illuminated ball scans back and forth across the end of the alley. You can release the ball at any point by pressing down on the ball-release lever at the bottom of the alley. When you hold the lever down, sequentially illuminated LEDs show a straight path of the ball into the pins. As you momentarily press and release the lever, you can control the hook or slice of the ball.

When the ball strikes the pins, the lights go out on the number of pins it hits, based on an electronic calculation of where the ball strikes. A sound effect corresponds to the number of pins knocked down. In each frame you have two chances to knock down all 10 pins. A strike occurs when you knock down all 10 pins with the first ball. When this occurs, an X flashes on the main display panel. For a strike, you receive the total value of the strike, plus the total of the next two balls. A strike is not added to your total score until you roll

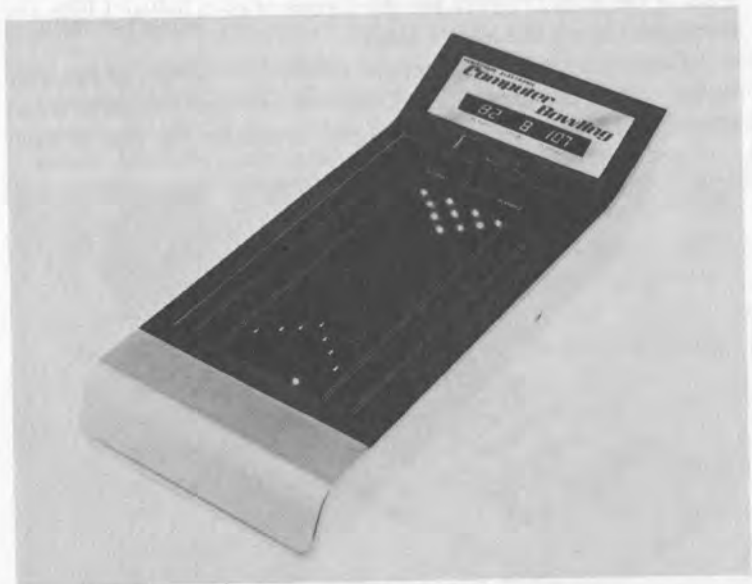


Fig. 9-56. Computer Bowling (courtesy Vanity Fair).

the next two balls. A spare occurs when you knock down all 10 pins with two balls. For a spare, you receive the total value of the spare, plus the number of pins you knock down with the next ball. A spare is not added to your score until you roll the next ball. To help you keep track of your score in the case of strikes or spares, special strike and spare LED indicators flash on the display.

Play continues through 10 frames.

BOWLATRONIC

This computerized bowling game (Fig. 9-57) can be played by up to four players, who control the ball's direction using curve, speed, and time of release. Coleco Industries' unit has an LED pro bowler figure, located above the configuration of bowling pins. Through the pro bowler, players determine the speed of the ball. As the pro bowler makes his approach and reaches the desired speed, the player matches his ball's release.

A hint path button provides coaching to the player. If you want to know the best path for a ball, push this button and a LED display lights up to show the optimum path. A series of four buttons allow each player to select the particular curve on every ball, while another row of buttons controls the exact release point across the width of the alley. Players see the course of each ball as LEDs are illuminated along the alley's length.

Electronic sounds enhance the reality of the game, as you hear the ball rolling and pins falling. Other sounds highlight gutter balls, spares, and strikes. A victory signal sounds at the end of each

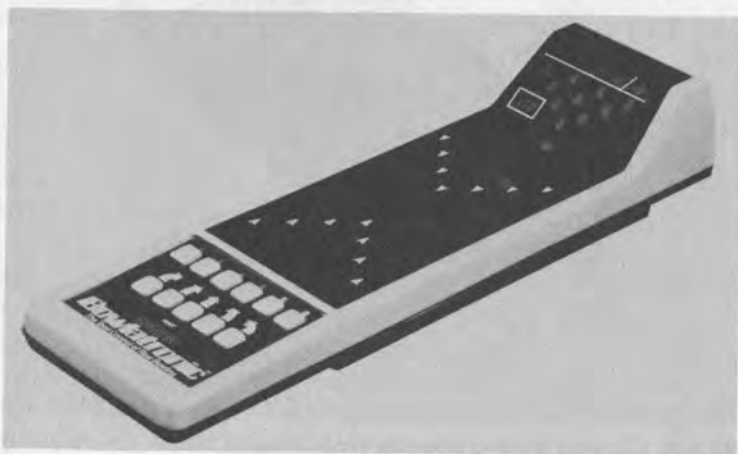


Fig. 9-57. Bowlatronic computerized bowling game (courtesy Coleco Industries).



Fig. 9-58. Bowling game (courtesy Mattel Electronics).

match. A digital display indicates which player is up, the frame, the score, and the mark—strike, spare, or open frame.

BOWLING GAME

This handheld self-contained unit (Fig. 9-58) has a unique mechanical feature that allows you to put English on the ball after its release by tilting the game. Two side flippers control the initial throw. Mattel's game is designed for one or two players, and the unit offers seven levels of play to challenge beginners and experts alike.

A built-in computer calculates the spin and angle of the ball before determining which pins are knocked down. The LED screen displays realistically shaped bowling balls and pins. Sound effects, simulating the rolling ball and the dropping pins, add realism to the game.

The game uses the scoring system that is used in bowling alleys. You can shoot for a perfect 300, but you can only attain high scores when you master your hooks and curves and avoid gutter balls.

BANK SHOT ELECTRONIC POOL

BANK SHOT is an electronic pool game from Parker Brothers that offers the fun and excitement of conventional pool. It has a

built-in cue stick, electronic balls of light, and a cushion rebound. It's a new way of playing pool.

You can play three different games. In the solitaire mode of straight pool, you have to sink three racks of balls in as few shots as possible. In the two-player mode, you and your opponent have to decide how many points it takes to win: 10, 20, 30 points, or more. The first to sink that number of balls is the winner. Poison pool is a two-player game that has a blinking "poison" ball as part of the rack. To win you have to sink the poison ball after sinking all the others. You can also set up an almost endless variety of trick shots and try to make them.

Let's try a shooting exercise, playing solitaire straight pool. Press the cue up/shoot button, and the cue ball and rack of balls appears (Fig. 9-59). The cue ball is brighter than the other balls. Press the aim button once, and two balls of light appear in front of the cue ball. This is the "pointer," which shows the direction the cue ball will travel when it's hit. Each time you press the aim button, the pointer moves clockwise around the cue ball (Fig. 9-60).

Once you have aimed, you can adjust, to the left or right, the path the cue ball will travel. This allows you to hit a ball at a different angle or hit a ball you couldn't hit otherwise. To adjust your hit, press the angle button once, and the pointer angles to the right. Press again, and the pointer returns to the straight ahead position. Press a third time, and the pointer angles to the left (Fig. 9-61).

Now you are ready to shoot. Press CUE UP/SHOOT twice. When you press it the first time, two balls of light appear behind the

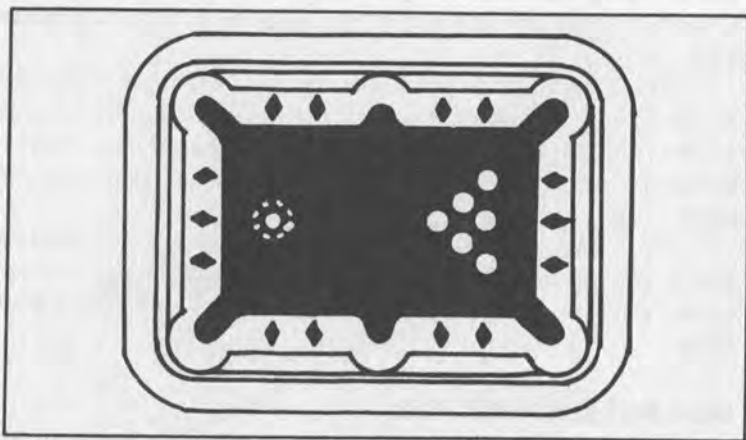


Fig. 9-59. The cue ball and rack of balls. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

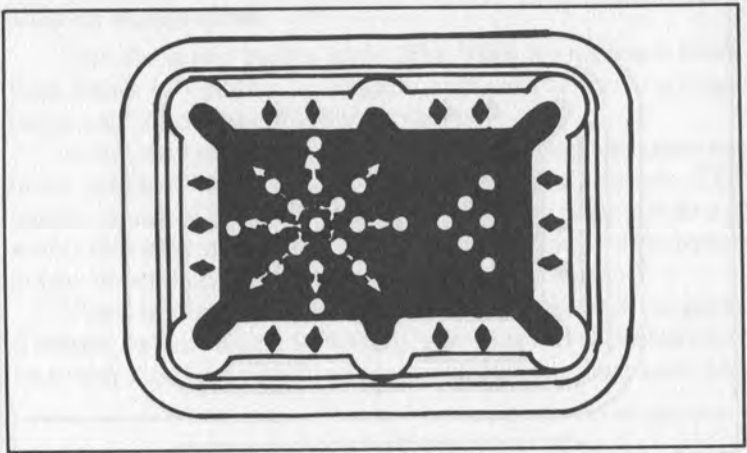


Fig. 9-60. Press the aim button, and the pointer moves counterclockwise around the cue ball. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

cue ball; these two lights represent the cue stick. Pressing the button the second time and holding it down causes the ball to travel. The longer you hold the button down, the faster the ball travels. To shoot your ball at full speed, you have to hold the button down until the accompanying “shooter’s tune” stops.

In pool, there are a number of basic shots. The straight shot is used when the cue ball and the ball you wish to sink are in line with each other (Fig. 9-62). To make the angle shot, you must aim the

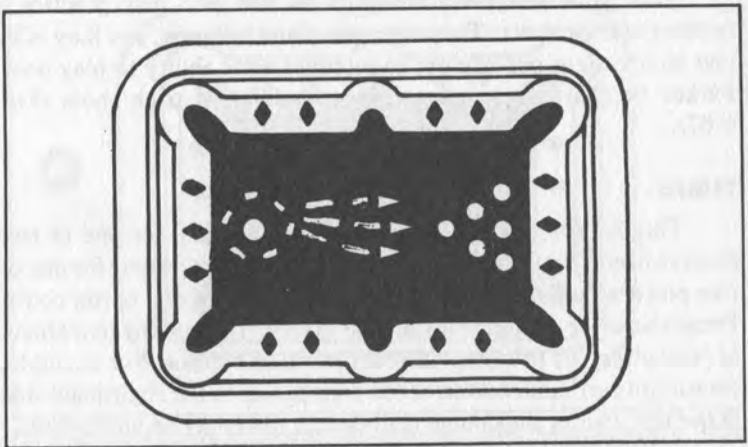


Fig. 9-61. Using the angle button to aim your shot. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

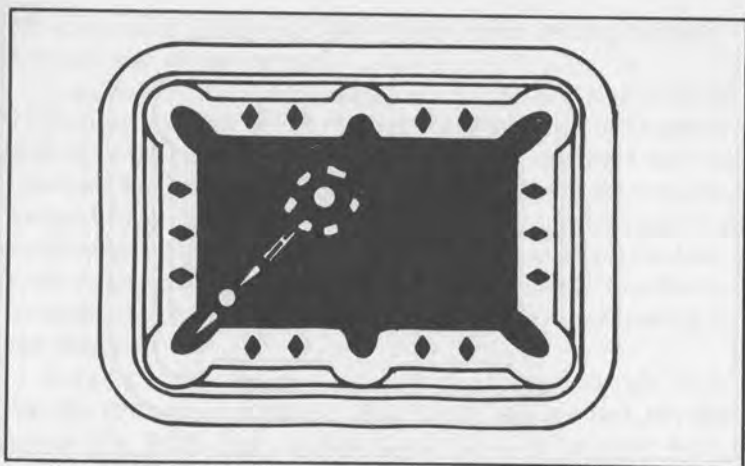


Fig. 9-62. The straight shot. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

cue ball to hit your intended ball at an angle and shoot the cue ball at full speed (Fig. 9-63). If you want to make a finesse shot, aim your cue ball as you would for an angle shot and shoot the cue ball at less than full speed. The slower speed makes your ball go off at a 90-degree angle (Fig. 9-64). To make a cushion shot, aim so that the cue ball and any other ball rebounds off one or more cushions (Fig. 9-65). In the combination shot, you have to aim the cue ball so that more than one ball is hit (Fig. 9-66). The more balls you use in this shot, the more difficult the shot becomes.

This game has been designed so that you may practice a number of trick shots. They are a genuine challenge, and they offer you an excellent opportunity to increase your ability to play pool. Parker Brothers has come up with 10 different trick shots (Fig. 9-67).

TENNIS

This is an electronic tennis game (Fig. 9-68) for one or two players from Tomytronic. A switch lets you select a game for one or two players, and a tennis player appears at each end of the court. Press the serve button and start the volley. You see the movement of your player by pressing different position buttons. For example, pressing a particular button sends your player to the right-hand side of the net. Faults and double faults occur randomly on your serve.

Scoring is flashed on the automatic score indicator at the top of the court and is kept exactly like a regular tennis game.

HEAD TO HEAD BOXING

This electronic boxing game (Fig. 9-69) from Coleco Industries allows two players to compete with each other, or a single player can compete against the computer.

At the start of the game, the Gillette fight song welcomes you to the match. Players are in complete control of their own LED boxers. A pair of buttons enables the fighters to block punches as well as throw them. Joystick controls allow movement of the boxers in four directions: backward, forward, left, and right.

Visual features and electronic sounds add realism to the game. A referee can be brought to the ring, escorting one of the boxers to his corner at the end of each round, guiding the standing boxer to his

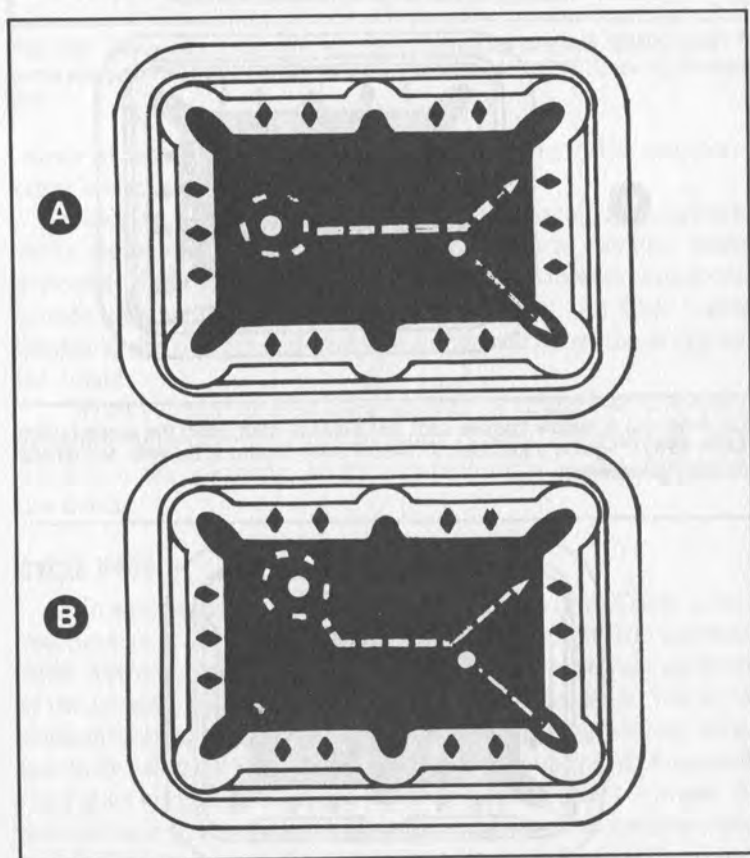


Fig. 9-63. (A) A simple angle shot. (B) Angle shot using the angle button. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

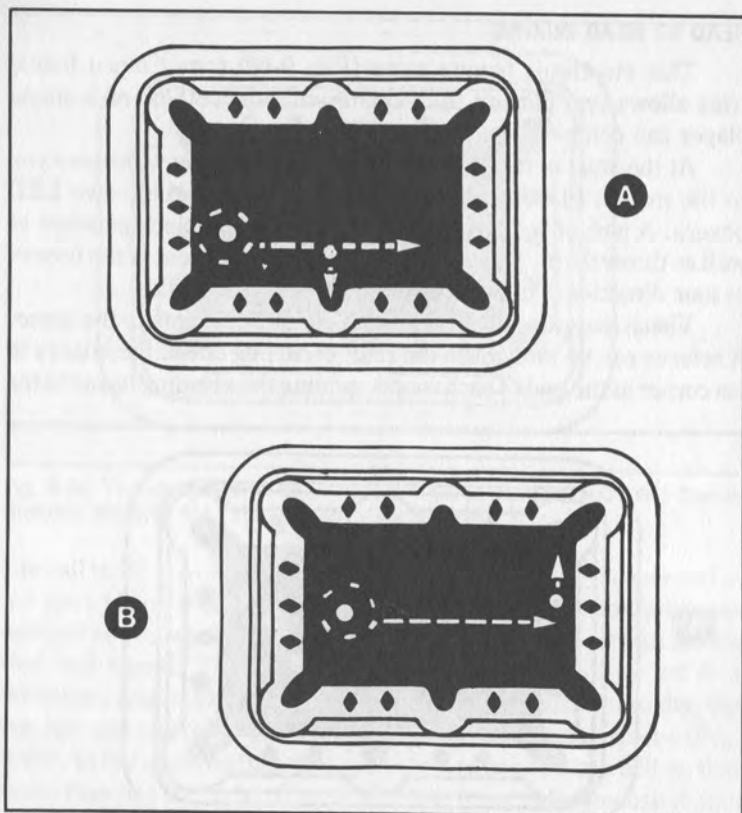


Fig. 6-64. (A) A simple finesse shot. (B) Finesse shot using the angle button. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

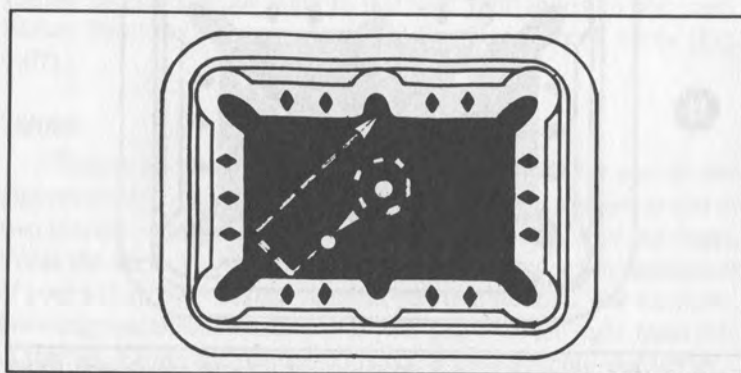


Fig. 9-65. Making a cushion shot. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

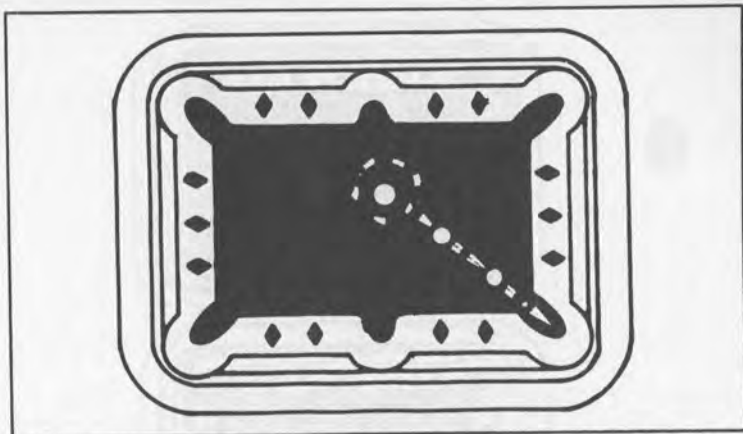


Fig. 9-66. Using the combination shot to hit more than one ball. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.

corner whenever a knockdown occurs, and holding up the victorious boxer's arm when the bout ends.

Separate and distinct tones, different for each boxer, indicate every move and each successfully landed punch. Another sound indicates that a punch has been successfully blocked. Electronic sounds also signal a knockdown and the count. An LED digital display keeps players and observers informed about the score and the round.

When you play against the computer, it changes skill levels at various points during a bout to more closely approach the level which you are operating, so the competition is heated throughout the match.

CYCLE RACE

To win this computer-controlled cycle race from Tandy Corp., you have to score as many miles as possible within 100 seconds. After you have turned the game on, you have to move your cycle out of the pit area (Fig. 9-70) and onto the three-lane track. You avoid crashes with other cycles by operating your steering buttons. Score points by using the speed control lever to pick up speed. Approaching cycles hit you from behind in the low-speed gear positions. As you increase your speed, the approaching cycles will increase their speed. Every time you crash, two seconds are subtracted from your operating time, and your cycle is returned to the pit.

Miles are displayed on LED counter.

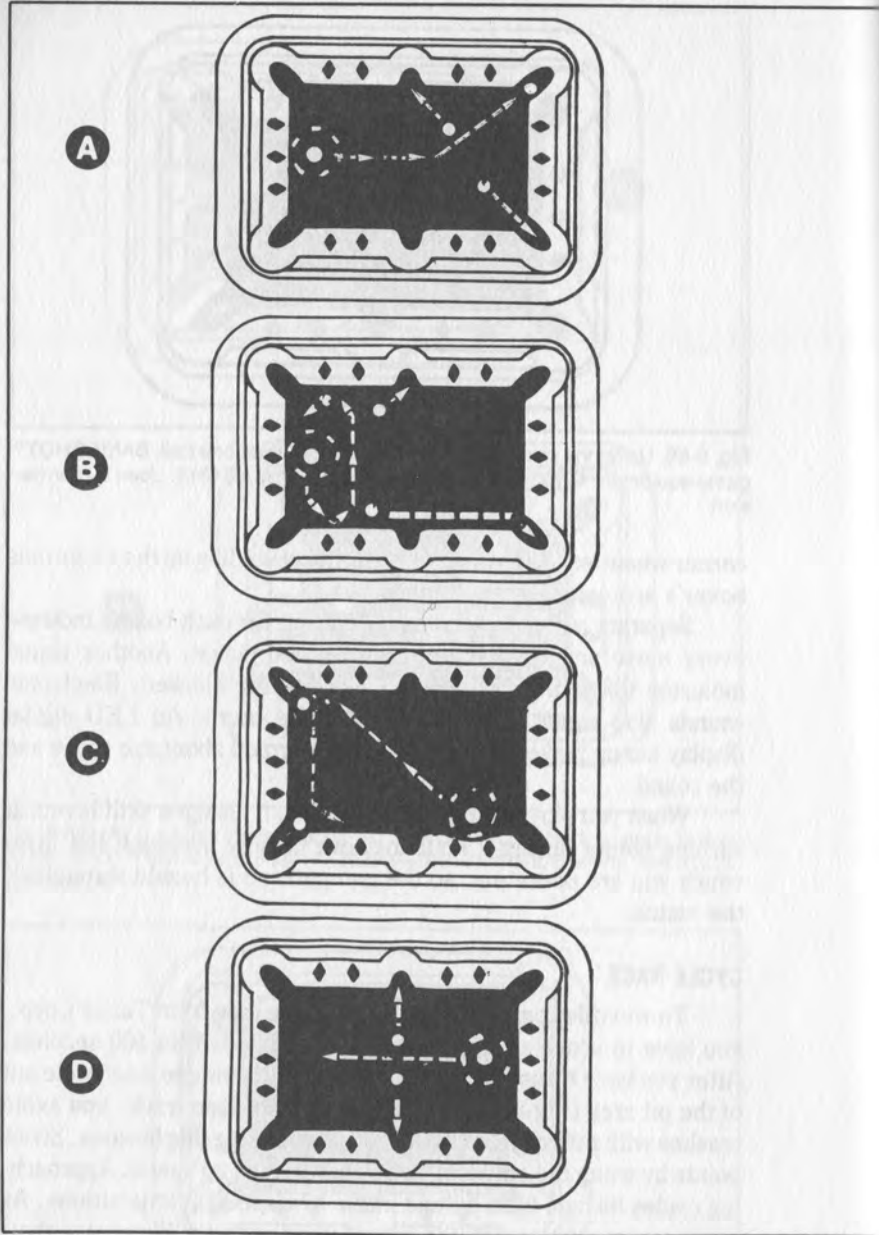
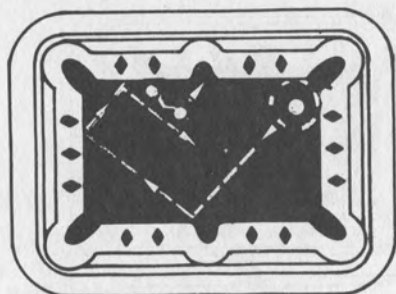
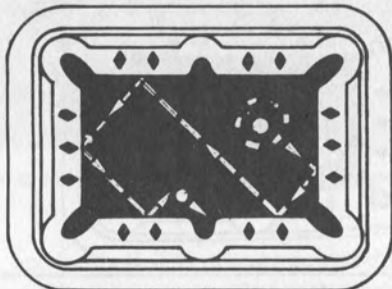


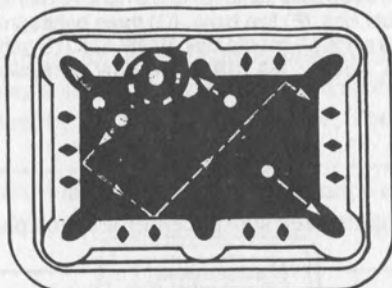
Fig. 9-67. Trick shots: (A) three balls sunk, (B) angle right, (C) full speed, (D) less than full speed, (E) double kiss, (F) five bank, (G) three balls sunk, (H) straight double kiss, (I) three balls sunk, (J) double kiss. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission.



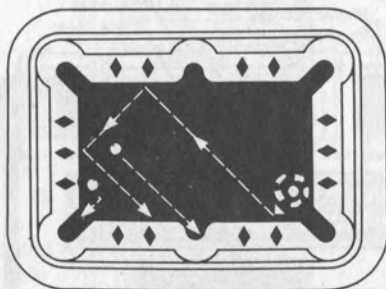
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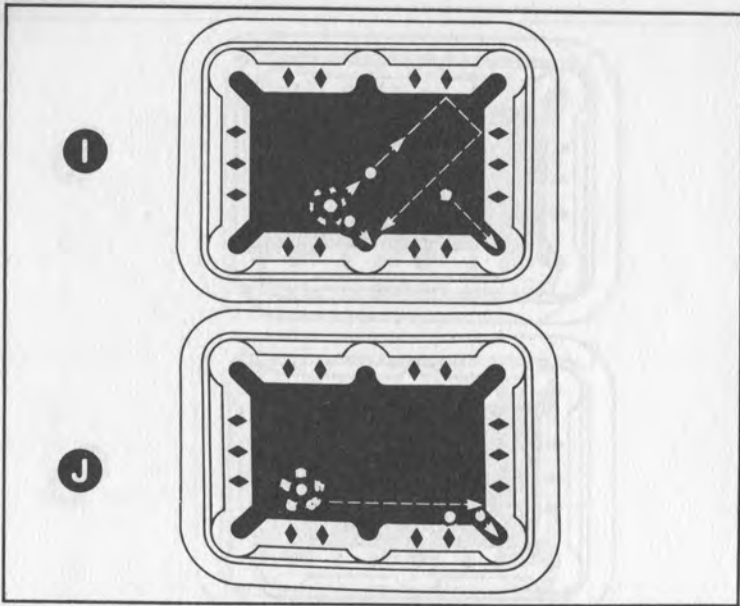


Fig. 9-67. Trick shots: (A) three balls sunk, (B) angle right, (C) full speed, (D) less than full speed, (E) double kiss, (F) five bank, (G) three balls sunk, (H) straight double kiss, (I) three balls sunk, (J) double kiss. BANK SHOT™ game equipment © 1980 Parker Brothers, Beverly, MA 01915. Used by permission. Continued from page 193.

SPORTS CENTER

Sports Center is a multiple sports game from Hirsch Co., Inc. (Fig. 9-71). This computerized sports center lets you play baseball,

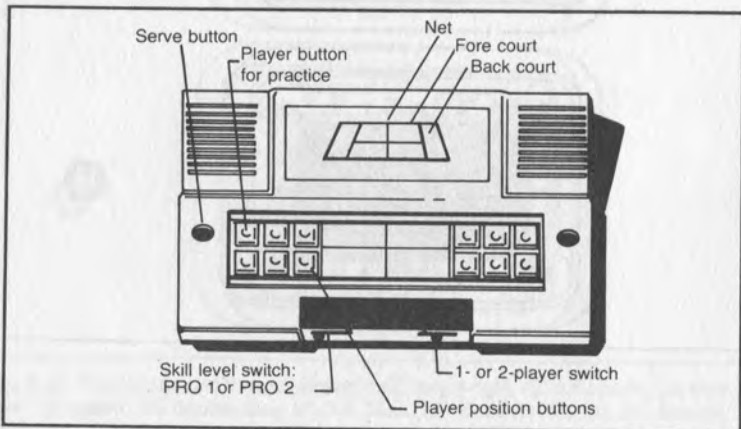


Fig. 9-68. Tennis game from Tomytronic.

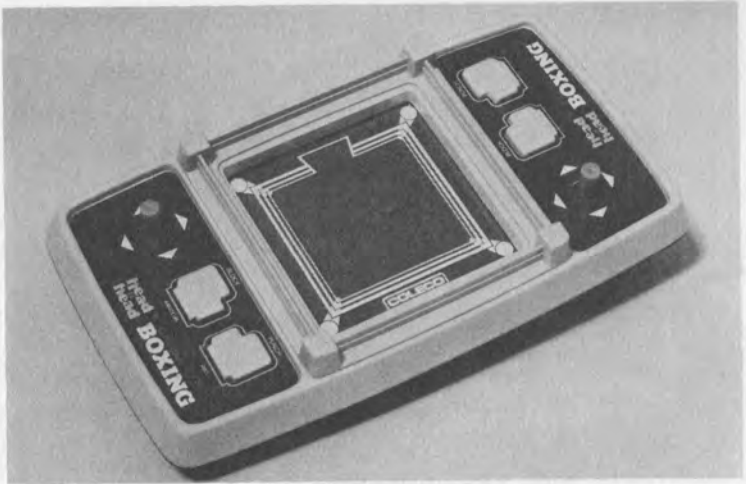


Fig. 9-69. Head to Head computerized boxing game (courtesy Coleco Industries).

basketball, and football. The playing field is different for each game, and each game has its own overlay with clear markings to identify the playing field.

The scoring for each team is displayed in sequence on the digital display screen. The visitor's team score is always displayed first, followed by the home team's score. The visitor refers to the

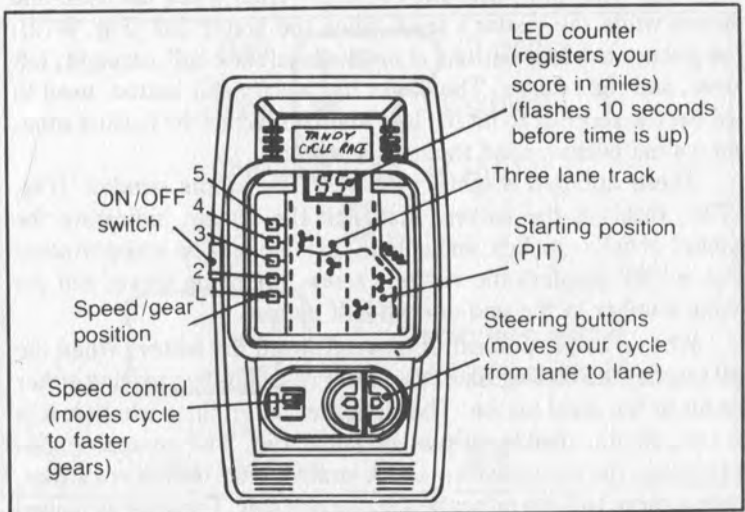


Fig. 9-70. Layout and controls of computerized Cycle Race from Tandy Corp.

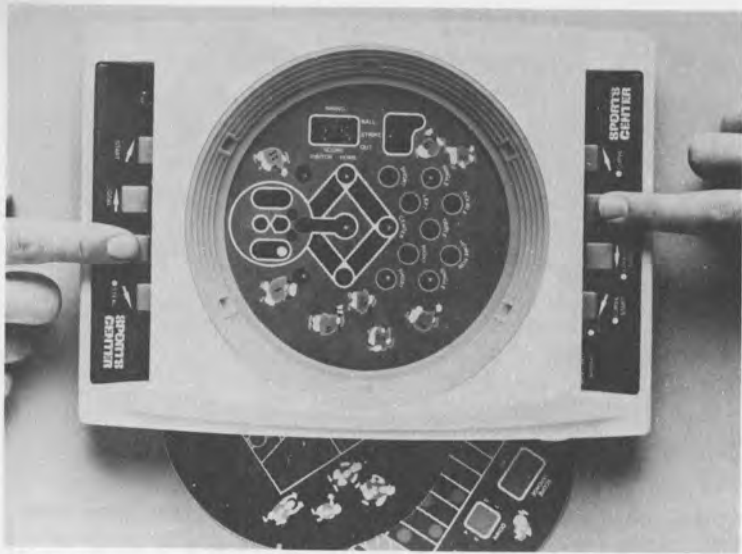


Fig. 9-71. Electronic Sports Center multiple sports game (courtesy Hirsch Co., Inc.).

offensive team at the start of the game. The score of each team consists of two digits; scores from 1 to 99 can be displayed.

Baseball

When you play baseball, the home team takes the field and pitches while the visitor's team takes the batter box (Fig. 9-72). The pitcher has four buttons at his disposal: fast ball, straight, left curve, and right curve. The batter has a score/hit button, used to find out the score or to hit the ball when it reaches the batting zone, and a steal button, used to attempt a steal.

There are two display windows. The status window (Fig. 9-73A) displays the current status of the inning, indicating the number of balls, strikes, and outs in that inning. The score window (Fig. 9-73B) displays the visitor's score, the home score, and the inning number at the end of each half inning.

When a ball is pitched, it moves toward the batter. When the ball reaches the batting zone, the batter responds by pressing either the hit or the steal button. The computer determines whether it is an out, single, double, triple, or home run. The computer also determines the success of a steal. A straight pitch is always a strike, while a curve ball can either be a strike or a ball. The game is played

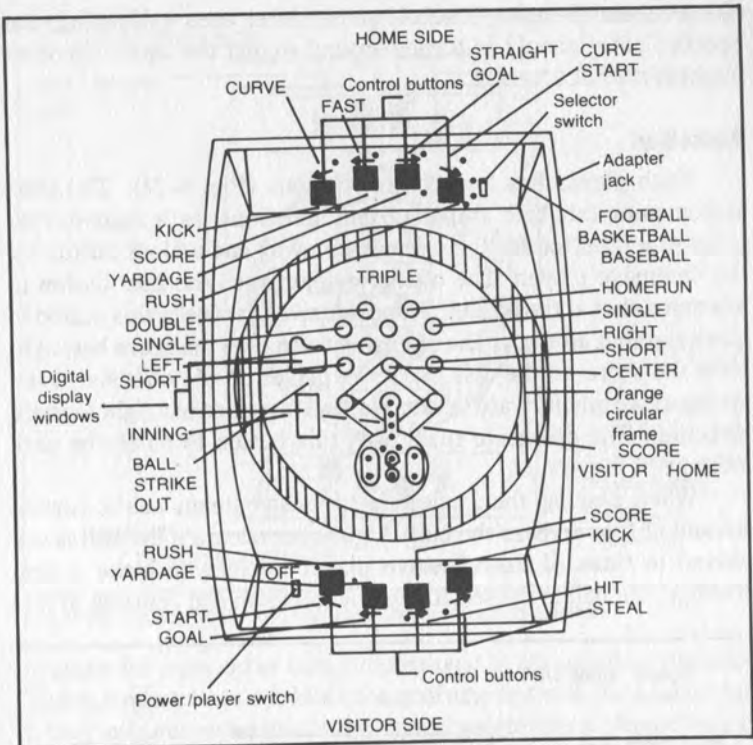


Fig. 9-72. Sports Center baseball field.

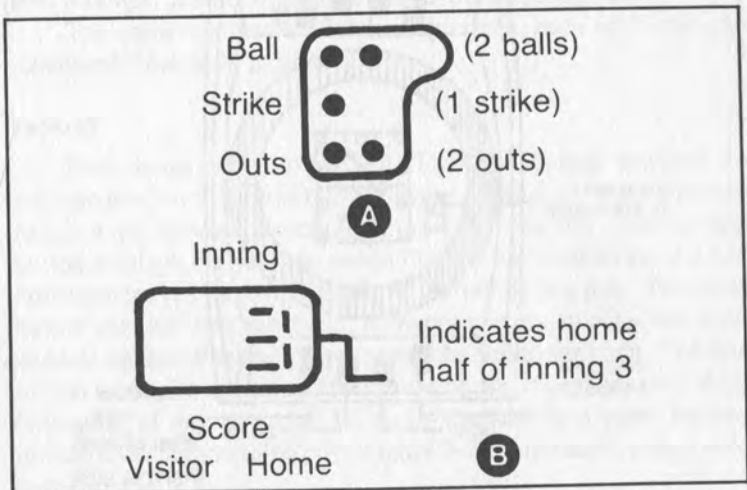


Fig. 9-73. Display windows used when playing baseball with Sports Center.

like a regular 9-inning baseball game. After each half inning, the Sports Center should be turned around so that the batter becomes pitcher, and vice versa.

Basketball

Each player has four control buttons (Fig. 9-74). The start button puts the ball into play and functions as a pass-to-the-forward-left button for the offensive player, and a block button for the defensive player. The offensive team uses the goal button to attempt a shot at the basket. The defensive team uses this button to block the shot attempt. The offensive team uses the score button to view the score on the display. If the player on the offensive team presses the right forward button, the ball is passed in a right forward direction. The defensive team uses this button to block the pass attempt.

When playing the game, the offensive team has a certain amount of time to pass the ball. A turnover occurs if the ball is not passed in time. If the offensive player decides to make a goal attempt, the ball is passed to the goal position and remains in this

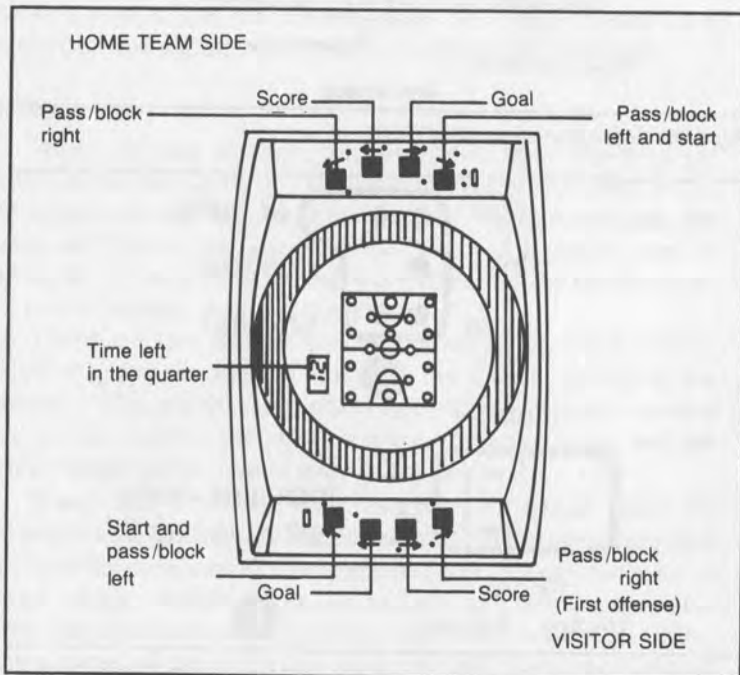


Fig. 9-74. Layout and control functions of basketball game in Sports Center.

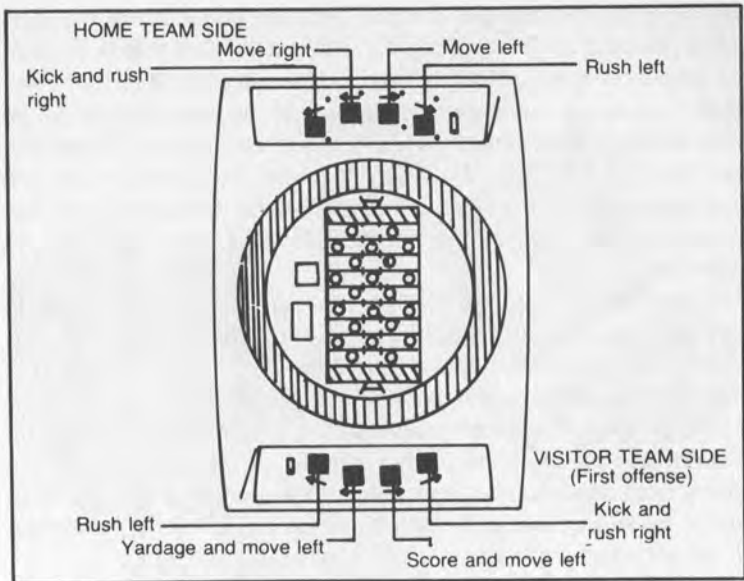


Fig. 9-75. Football field and control buttons in Sports Center.

position for a period of time proportional to the shooting distance. The defending team can block the goal attempt with the goal button. If they are successful, the ball goes to the defenders. Should they be unsuccessful in the block attempt and the defender successful in the goal attempt, 2 points are awarded to the shooting side.

The game continues until four quarters, each of 15 minutes simulated time have passed.

Football

Each team has four buttons. The rush button displays the yardage needed to score a touchdown or a first down and moves the ball in a left forward direction during a rushing play. The yardage button displays the yardage needed to score a touchdown or a first down and moves the ball laterally to the left during play. The score button also has two functions, allowing players to view the score and letting the offensive player move the ball to the right. The kick button is used to make a kick attempt by the offensive team at the beginning of any play and to move the ball in a right forward direction during a rushing play. Figure 9-75 illustrates these control buttons.

The visiting team, as the offensive team, should decide at the start of the game between a rush and a kick. Pressing the rush

button at the beginning of the play puts the ball in a rushing play. After pressing the kick button, if a kick is attempted within 16 yards of the opponent's goal, a field goal may result. A kick further away than 16 yards is a punt, and possession of the ball changes. In the case of a punt, the computer determines where the new offense will put the ball into play. Defending players are controlled by the computer and move randomly in a horizontal direction. Yards are gained by avoiding the defensive LEDs and moving in a forward direction.

On the playing field one yard is equivalent to the distance between the adjacent rows (Fig. 9-76). The ball carrier must advance at least 10 yards within four downs to allow continuation of the rush. If he does not accomplish this, the ball goes to the opposing team. The number of downs is indicated by red lights on the display screen. A touchdown is awarded 7 points. The offense starts from down number one, and after a down he will be in down no. 2, and so on. However, if he completes 10 yards before down no. 4, he will start from down no. 1 again in the next play.

PLAYMAKER

This game from Tiger Electronic Toys, offers three games in one: basketball, soccer, and hockey. Game cartridges are inserted into the basic computer, which automatically selects the program corresponding to the cartridge.

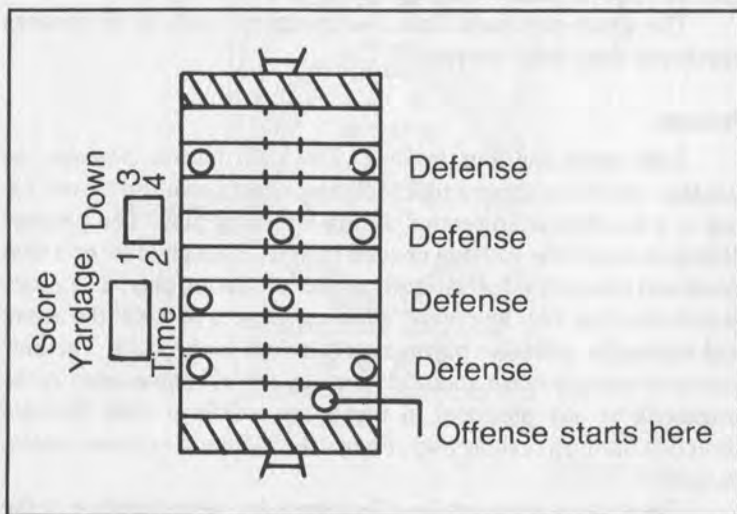


Fig. 9-76. Division of football field in Sports Center.

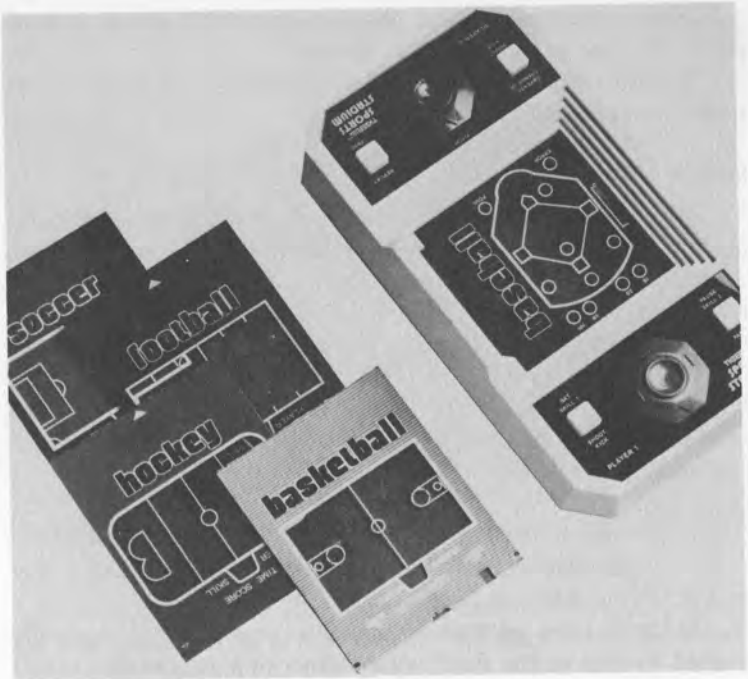


Fig. 9-77. Sports Stadium (courtesy Tiger Electronic Toys).

SPORTS STADIUM

Insert one of five specially designed playing fields into the top of the unit (Fig. 9-77) from Tiger Electronic Toys, and you can play football, baseball, basketball, hockey, or soccer. Each insert is electronically coded to produce a true-to-life field and action sound. There are nine skill levels. You can play offense or defense and compete against yourself or other opponents.

The football field offers running, passing, and kicking plays; sacks; fumbles; touchdowns and safeties; pass completions, interceptions, and incompletions; blocked kicks; and four quarters of 15 simulated minutes per game.

Baseball offers nine innings of play. The offensive player can time his bat swing and determine to which field the ball will be hit, and the defensive player can set the defensive strength. The defensive player can throw one of four basic pitches and change speed on all four. The game also features errors, walks, strike-outs, and singles, doubles, triples, and home runs.

In basketball, there's passing, shooting, turnovers, out-of-bounds, steals, and missed shots.

Hockey features passing, shooting, turnovers, steals, missed shots, realistic puck action, and faceoffs.

The soccer game offers passing, shooting, turnovers, out-of-bounds, steals, and missed shots.

FINGER BOWL

One to eight people can team up, or you can compete individually in this action packed game (Fig. 9-78) from Tiger Electronic Toys. It has a total of eight events that take place on a strategically numbered, circular track of a simulated sports arena.

The focal point is the fastest finger. Players don finger "sweatbands" in preparation for the action. The sweatbands are smooth fingertips with talcum powder (provided from small kegs) to ensure maximum sliding speed on the track. Players ready their fingers at the starting line, and wait for the sound of three beeping signals: ready, set, go.

In the Mile Run, the winner is the player who slides his or her fingers around the track in the fastest time, passing over every number in the different field locations.

In the Hurdles you have to jump your finger over strategically located hurdles on the field, without knocking any down.

To win at Relays you must slide over all the numbers quickly and switch fingers on the next lap without losing time by fumbling.

In Discus, "wind up" your finger on three numbers in accordance with the timed beeps, and when the tone of the beep changes, let your finger loose around the track.

You want to Hop, Skip, Jump; skip one number, hop across



Fig. 9-78. Finger Bowl multiple sports game (courtesy Tiger Electronic Toys).

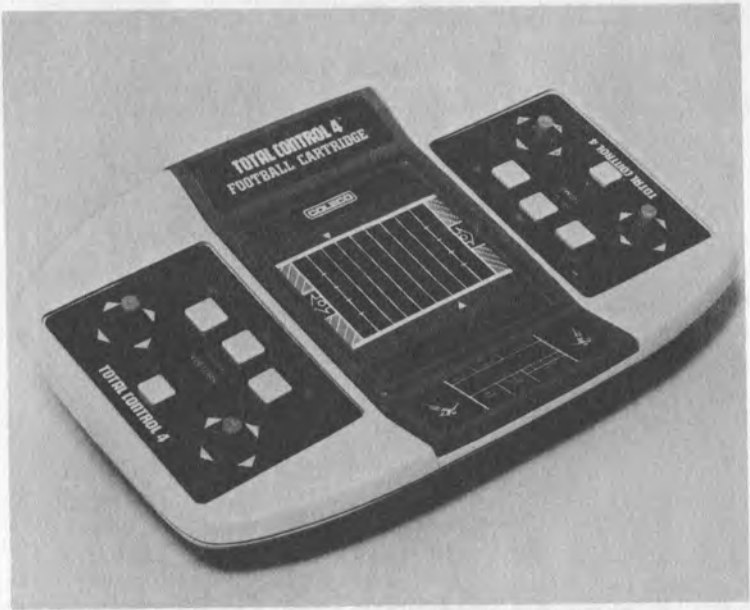


Fig. 9-79. Master console of Total Control 4 multiple sports game (courtesy Coleco Industries).

two, and jump three. Do this twice around the track. That's eye-finger coordination.

Try the Walking Race. Hand over hand, finger by finger, number by number, you must touch the board at all times while completing the race.

In Pole Vault, stack your hurdles at the desired height at station number 10. Run your fingers around three-quarters of the track, touch numbers 1 through 8, jump to clear the hurdle, and continue the race for time.

You can also do the Long Jump: slide over numbers 1 through 7, jump to 13, and race to the final finish line.

You think you can cheat? The computer is your timekeeper, scorekeeper, and official throughout the event. Every mistake your fingers make is penalized: fallen hurdles, knocked down pole vaults, and any carelessly missed numbers on the field. An elevated scoreboard in the backfield keeps score.

TOTAL CONTROL 4

With this sports cartridge system (Figs. 9-79 and 9-80) from Coleco Industries, one player can compete against the computer,



Fig. 9-80. Game cartridges for multiple sports game Total Control 4 (courtesy Coleco Industries).

against one or two opponents, or four players can compete team against team. The system consists of a master console and four game cartridges, football, basketball, soccer, and hockey.

The football cartridge lets you control two players, on the offensive team, a quarterback and a receiver, and two players, on the defensive team, a safety and a linebacker. Players can set offensive and defensive line formations and run plays, such as trap, draw, and misdirection plays, square in, roll out, and screen passes. Controllable figures are directed by two joysticks on each side of the console. The figures, represented by LEDs that glow more brightly for the offense than for the defense, can be moved to the left, right, forward, and backward. An electronic scoreboard informs you of the



Fig. 9-81. Sports Arena multiple sports game (courtesy Tandy Corp.).

number of downs, number of yards to go, and the yard line at which each play takes place. Scores are tallied at the touch of a button.

When you use the basketball cartridge, you control two offensive forwards, and a control guard and center on the defense side. Four-way movement on the court is possible. Either offensive player can control the ball, which can be passed between players or shot at the basket. Other actions include setting picks, stealing the ball, set shots, and lay-ups.

The hockey cartridge features a controllable goalie and defenseman on one team, and a pair of left and right wings on the other. While the goalie moves laterally in his assigned area, the other three players are capable of four-way movement on the ice. You can make forward, diagonal, and wraparound passes. Plays behind offensive and defensive goals are possible.

The soccer cartridge is also programmed so that you can control two team members on each side. Many real soccer actions are possible.

The game package comes with the football cartridge only.

SPORTS ARENA

This multiple sports game (Fig. 9-81), from Tandy Corp., offers the opportunity to play basketball, soccer, or hockey. Separate playing field graphics slide over the master console. The offensive player is represented by a bright blip, and the defensive players are dimmer blips.

When you shoot, a bright blip moves from the offensive player toward the goal/basket. Shots move at a 45-degree angle toward the center of the playing field and then straight for the goal/basket. If a defender is in its path, the shot is blocked. If the shot misses, or one of the defensive players touches the offensive player before a shot, the play is over.

Chapter 10



Multifunction Games

These games offer you a variety of different games on one computer. The games may be related to each other or they have nothing in common.

FABULOUS FRED

This multiple computerized game (Fig. 10-1) from Mego offers nine different games from an electronic organ to a memory game to roulette.

In Electronic Organ, you push buttons 1 through 9 to play a variety of melodies as given by the instruction manual.

Music Machine lets you compose your own songs using not only quarter notes but eighth notes as well. The unit accepts a total of 50 notes and rests per song. You can also program the computer to play the songs listed in the manual.

What's that Song is a contest to see who can guess the lowest number of notes in a particular song from Electronic Organ and Music Machine.

The object of the Memory Game is to test your skill at mimicking the computer. Whatever notes the computer plays, you must play. Every time the computer takes a turn, it adds one more note to the series. Duplicate the same series Fabulous Fred produces, and he'll let you know you're correct by making a brief signal tone. After the first fanfare, the computer speeds up to make the game harder.

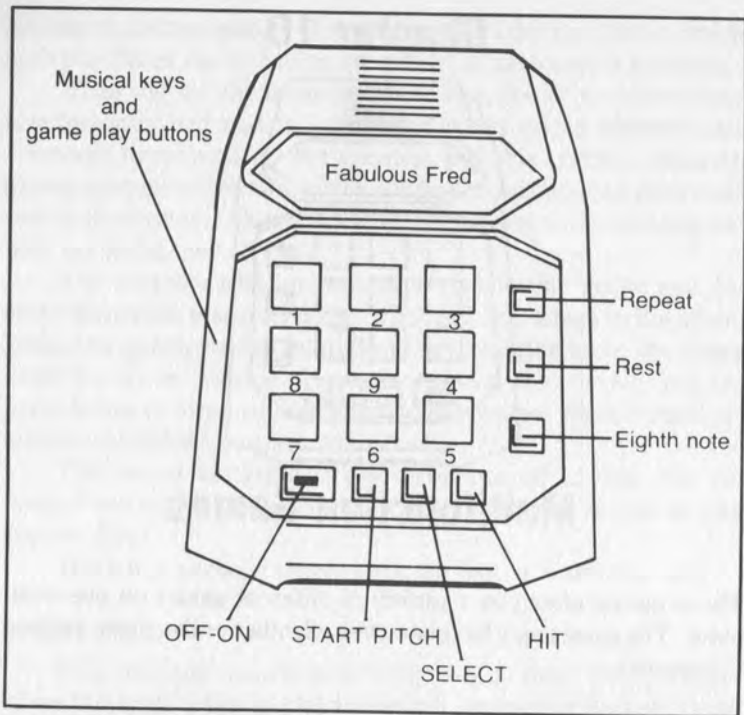


Fig. 10-1. Fabulous Fred multiple game.

In Mindbender, the computer thinks of three numbers, and you must find out what they are.

Space Attack tests your skill at destroying 25 enemy attackers before they reach their targets.

In Submarine Hunt, there's an enemy submarine hiding under one of the nine tone buttons, and you have to find its location before it finds you. The computer gives you three chances to find the submarine, and some valuable clues help you in your task.

Catch the Comet is a very fast game. The computer blinks at random 100 times, and you've got to tag the blinking tone button before the light goes out.

Baseball lets you play ball.

When you play roulette, the electronic ball comes to rest on one of the nine numbers.

TIME OUT

This palm-sized multiple game package from Mego offers five games.

Toss Up has two modes, A and B. The A mode features a nimble-handed juggler, and your split-second decisions help the juggler keep two balls in the air. In game B, the juggling takes place at a much faster pace, and the juggler has three balls instead of two. When a ball is dropped, the game is over.

In *The Exterminator*, moles are on the loose, and you have to stop them before they slip by. In game A, the moles climb up and attempt to sneak through any of four holes. Hit them before they do so. In game B, the pace is much faster, and the moles have an additional escape hole.

In *Fireman Fireman*, the building is on fire. People are jumping, and you control the stretcher. It's up to you to get the jumpers safely into the waiting ambulance. In game A, up to five jumpers leap simultaneously. You must maneuver them to safety. Each time you fail, the jumper crashes and reappears as an angel. Three angels, and the game is over. In game B, the rescue mission is even more challenging, because up to nine people will jump at once.

Game A in *Flag Man* is a fast response game. The flag man creates a random number sequence, and you must press the appropriate buttons to match the sequence. The built-in timer allows you 5 seconds. Game B allows you only 2½ seconds to match each number he flashes.

SIMON

Simon, from Milton Bradley, is a game of skill (Fig. 10-2). The idea is to try to reproduce the sequence of lights and sounds that are generated by the built-in microprocessor. There are thousands of random sequences to test your powers of concentration and memory. The unit offers three game variations, and you can set the level of difficulty.

Simon Says is a game for one or more players. In this game you have to repeat correctly an increasingly long sequence of signals. Simon gives the first signal, and you repeat it by pressing the same color lens. Simon repeats the first signal and adds one, and you repeat these two signals by pressing the same color lenses. Simon repeats these two signals and adds another one. You continue in this manner as long as you repeat each sequence of signals correctly. After the fifth, ninth, and thirteenth signals in a sequence, Simon automatically increases the tempo. Fail to repeat a sequence or take more than 5 seconds to repeat a signal, and you get a razz sound. You've lost, and you have to start over. At skill level four you have to repeat 31 signal sequences to win the game. If you do so, Simon



Fig. 10-2. Simon multiple game (courtesy Milton Bradley Co.).

blows its mind, loses its memory, and gives itself the razz sound.

Player Adds lets you create an even longer sequence of signals. Simon gives only the first signal. It does not repeat the signals you play. You must repeat the signal Simon gives you and add one more. Then repeat the first two signals and add one more. Continue repeating the signals of the previous sequence and increasing that sequence by one. The longest sequence you can reach is 31 signals.

Choose Your Color can be played by two, three, or four players. The object is to repeat correctly a sequence of up to 31 signals. Each player chooses one color lens and uses only that color lens during the game. Simon gives the first signal. The player operating that color repeats the signal. Play continues as described in Simon Says, except that each player pushes only his or her color in the proper sequence. You have only 5 seconds to respond, and if you push your color out of sequence, you're out of the game.

SUPER SIMON

Super Simon, another game from Milton Bradley, consists of two rows of colored lights (Fig. 10-3) as opposed to the single circular array in Simon.

What's New is a game of concentration with four skill levels and three speeds that can be enjoyed by one or more players. Repeat the sequences of flashing lights and tones. A new sequence is generated every time Super Simon adds a signal. Compete against the computer or against others to test their powers of concentration. Sequences do not increase cumulatively; after you repeat a four-tone sequence correctly, for example, Super Simon may give you an entirely new sequence of five tones to repeat. If you fail to repeat a sequence, you're out!

You're Out is a game for two or more players with four skill levels and three speeds. You have to press assigned color lenses at certain times to repeat the sequence correctly. A new sequence is generated every time Super Simon adds a signal. Super Simon signals with the new sequence of tones to let you know which player must repeat the signals by pressing his or her color lenses at the proper time and in the proper order. Here again, sequences do not increase cumulatively.

You're It is a color elimination game with three speeds for two or more players. In this game, Super Simon flashes all the color lenses, running up and down them like a piano player on a keyboard. The last color lens lit up indicates who has been chosen to be "it," and the player assigned that lens repeats the signal that Super Simon first gave.



Fig. 10-3. Super Simon multiple game (courtesy Milton Bradley Co.).

Get With It has four skill levels and three speeds for one or more players. The object of the game is to repeat the ever increasing sequence of flashing lights and tones correctly and at the same time as Super Simon repeats the sequence. In head-to-head competition, challengers play the same color lenses at the same time. Super Simon's decision button picks the winner.

Fast Hands gives you a continuous sequence of random lights at ever increasing speed. The challenge is to press the buttons while they are lit. Rapid-fire response is necessary. If you press the 31 lenses activated by Super Simon while they're still lit, you win the game.

POCKET SIMON

This is a miniature version of Simon (Fig. 10-4) that is played just like Simon, complete with colors, sounds, and the famous razz.

SPLIT SECOND

This is a multiple game of speed and skill, of variety and change, of personal challenge and head-to-head competition from Parker Brothers. There are five basic games: Mad Maze, Space Attack, Auto Cross, Stomp, and Speedball. Mad Maze has three variations: Mad Maze Visible, Mad Maze Preview, and Mad Maze Invisible. Space Attack has two variations: Space Attack Beginner and Space Attack Pro. The object of all games is to finish in the shortest possible time.



Fig. 10-4. Pocket Simon miniature version of Simon (courtesy Milton Bradley).

Although the word "second" is used, it is not an exact measure of time. As a player, you should interpret it as "moment" or "instant."

In *Mad Maze Visible*, the object is to move a ball through a series of 10 different mazes in the shortest possible time. Arrow buttons on the unit let you maneuver the ball. As soon as you have moved the ball into the goal, the maze vanishes and a new one appears at the opposite end of the screen. This pattern continues until you have completed 10 mazes.

Mad Maze Preview is similar to the game described above, but there's a difference. Each maze appears on the screen for only a brief moment. You have to try to memorize the image and grope your way through the maze to get the ball into the goal.

Mad Maze Invisible makes it even more difficult for you; no maze appears on the screen at all. You have to maneuver the ball by trial and error through the unseen maze and into the goal.

In *Space Attack Beginner*, an enemy space ship appears at one end of the screen, and at the center of the screen a single dot also appears. This is the core of your force field, a vast, powerful area of electromagnetism that is completely under your control. You must draw the enemy ship to this core; it will be unable to resist your control. As soon as you draw the ship directly over the core, shoot it down with your lasers. You have eliminated it, but another one appears, either at the top or bottom of the screen. You have to shoot down eight ships in the shortest possible time. See if your opponent can do it faster.

Space Attack Pro is similar to *Beginner*, but the enemy ships try to evade you by constantly moving in random directions. Here, you need a lot more skill to maneuver the ship over your force field's core and shoot it down. The more time you take to shoot the ship down, the slower its movements are, making it easy to shoot it down but lowering your score. Shoot it down fast, the faster the next ship will move, and the better your score.

In *Auto Cross*, you have to move your car, a single bar, through a series of 16 obstacles, one after the other. The obstacles can be either a single dot or a pair of dots. When you're faced with a one-dot obstacle, you have to move your car around the dot. When you have a two-dot obstacle, you must maneuver your vehicle between the dots. As soon as you've overcome an obstacle, it vanishes and a new one appears. Simple? The "car" acts like a real vehicle; the faster you "drive" it, the higher the frequency sound of the motor. Stop the car, and the motor idles. Then you have to pick up speed again,

losing precious seconds. Move the car off the screen, and you have crashed. After the crash, the car remains in place, blinking, for about a second, and you lose precious time again.

You want to play Stomp? Not easy. You have to hit 20 targets in the shortest possible time. A target, shaped like a "goal," may appear in either one or two parts. It is on the screen for only a second or so. When there is one part to a target, you must hit the corresponding arrow button before the target disappears. When there are two parts to a target, you must simultaneously hit both corresponding arrow buttons before the targets disappear.

You want to capture a moving object fast? Well, in Speedball, you have to capture five moving balls in the shortest possible time. A moving ball appears, and, at the same time, a four-part line with its front part flashing also appears. You use the directional buttons to box the ball in with the line, but the ball continues to move, so it's like trying to lasso somebody. You direct the front of the line, the flashing part, around the ball and the rest of the line follows. Finally, you've captured the ball. Immediately, another one appears, and the chase continues. There are five of them to capture.

MERLIN

This unit from Parker Brothers has six built-in games, Tic-Tac-Toe, Music Machine, Echo, Blackjack 13, Magic Square, and Mindbender.

In Tic-Tac-Toe, you have to beat the computer to be the first to occupy three squares in a row, horizontally, vertically, or diagonally.

In Music Machine you can teach the computer a tune and then be entertained as it is played back to you.

When you play Echo, the computer plays a tune. Listen carefully to the notes, and watch closely the lights that accompany them. When the computer stops, try to repeat the exact order of notes and accompanying lights by pressing the appropriate buttons.

In Blackjack 13, your hand of 13 or less must be higher than MERLIN's. MERLIN is the dealer. Both of you start the game with a hand of one card, and you also start the game with a stake of five chips. You can either hit or stand. If you want to hit, you ask for another card. If your hand totals less than 13, you can again either hit or stand. If your hand totals more than 13, you bust and lose the game. When MERLIN has less than 10, he hits. If he busts, you win. If his hand is 10 or more, he stands. The computer automatically compares its hand with yours to determine the winner.

MERLIN has nine buttons numbered 1 through 9 and arranged in three rows of three. In Magic Square, you have to form a square of eight lights (eliminating the center button) after MERLIN has shown you very briefly the magic square.

Mindbender challenges you to discover a mystery number in the computer's brain. When, for example, you press 4, the computer selects a random four-digit number, which you have to discover through a process of deduction. You have to discover all four digits in the correct order.

ELECTRONIC GAME MACHINE 2

With this computerized multiple game machine (Fig. 10-5) from Hirsch Co., Inc., you can play five different games.

The object of Code Hunter is to find a four-digit secret code number, hidden in the computer's memory, in as few turns as possible. You start by entering any four digits. The computer displays two numerical clues: the left number indicates the number of correct digits guessed that are in their exact position, and the right-hand number indicates the number of correct digits that are in the wrong position.

Grand Prix is a racing game, but you also have to avoid collision with oncoming cars to reach the top score of 99. You have to accomplish this in about two minutes. You use the gas, brake, and change lane keys to control your car and the other cars in the lanes to avoid a collision.

Sub Hunt gives you two minutes to destroy as many sub-



Fig. 10-5. Game Machine 2 multiple game machine (courtesy Hirsch Co., Inc.).

marines as possible without being hit by a torpedo. You are moving your destroyer. You avoid the approaching torpedos by maneuvering your ship. You can't see the submarines, but you hear beating sounds coming from below your ship. Somewhere there's a sub; the sounds beat faster. The sub must be right under your destroyer. You press the fire button, and the sub is destroyed. You get 5 points if you get a hit the first time you fire. If the sub is destroyed the second time you fire, you get 3 points.

In the Blackjack mode, the machine plays the game as in ordinary blackjack. You must reach 21 points without going over 21. You can bet, hit, stand, insure, split, and double.

The object of Shooting Gallery is to hit the target as many times as possible in 30 shots. You can choose from two target patterns. In the cyclic pattern nine targets move from left to right and six move from right to left. The random pattern moves the target randomly around the screen in either form and in any one of 20 spaces. When the target moves around the screen, you have to press the proper key at the exact moment to hit the target.

WIZARD

Hirsch gives you four electronic games with 11 ways to play. The Wizard (Fig. 10-6) has four color keys and a square playing field with 16 red lights.

In Hot Corners, four players each place a finger on one of the colored buttons. At the count of three, all players press their buttons, and a red light moves on the outside perimeter of the square. You must bat away the red light at the exact moment it arrives at the lamp closest to either the left side or right side of your button. The speed of the moving light increases until a player is eliminated. Then it returns to its slowest speed, picking up speed until another player has been eliminated. You can also play the game with two players, each defending two corners, or one player can defend two corners against two other players.

When you play solitaire in Match Me, you have to successfully remember and repeat signals generated by the computer. Each game has a different sequence, and there are four levels of difficulty, a 10-, 15-, 20, or 25-sequence memory game. It is in many ways similar to Simon.

In Music Maker, you can teach the computer to play a tune of up to 30 notes and direct the Wizard to play the tune back to you in the correct rhythm. When you play game I, you compose your own

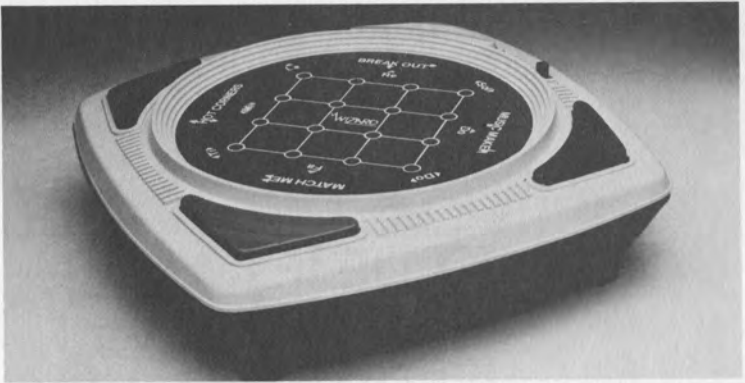
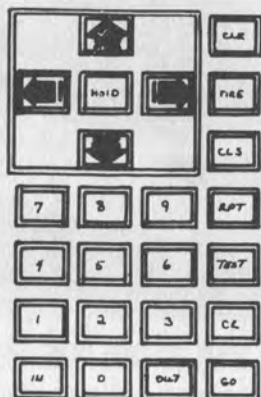


Fig. 10-6. Wizard multiple game (courtesy Hirsch Co., Inc.).

music. In game II, you program the computer to play any of the 30 songs listed in the accompanying tune book.

Breakout is a solitaire game. The four colored buttons become your pathfinders to get you out of a maze. You have to find the secret path. To move the red light in a chosen direction, you press one of the buttons. If the direction you have selected is the correct first step of your path, the light moves to the next position in the maze. If you have made the wrong choice, or a wrong move, the computer sends you back to the beginning, and you must remember all the correct moves you made previously, so you can get back to where you were when you made the wrong choice.

Chapter 11



Miscellaneous Games

This chapter includes games that could not easily be classified elsewhere, such as pinball games, swatting a mosquito, and playing gunfighter.

SWAT SWAT THE MOSQUITO

This game (Fig. 11-1), from Coleco Industries, is designed for one to four players. It tests your reflexes as mosquitoes swoop, dive, and land at random on one of four playing stations. Four plastic swatters are provided and it is up to you to swat the electronic mosquitoes before they get away.

There are two modes of play. In the first mode, the first player to get five mosquitoes is the winner. Players are eliminated in the second mode if they are bitten five times after failing to successfully swat the mosquitoes.

Five game sounds accompany the play. A buzz sound indicates the positions of the mosquitoes on the playing field and that the game is in play. A bite sound tells you that the mosquito bit you. A last gasp sounds when you've gotten the mosquito. The elimination sound indicates that you have five mosquito bites, and you're out. The win song indicates the winner, and the game is over.

In game 1, the mosquitoes buzz around, randomly landing at a participating player's position. Swat the mosquito before it gets away. You know you've succeeded when the mosquito blinks and



Fig. 11-1. Swat Swat the Mosquito (courtesy Coleco Industries).

fades out in your position, and you hear the last gasp sound. The better you are, the faster the mosquito goes. You have to be fast with your reactions. The first player to get five mosquitoes wins.

In game 2, the mosquitoes also buzz around, randomly landing in a participating player's position, but you have to swat the mosquito as soon as it lands, because otherwise the mosquito will bite you. Five mosquito bites, and you're out. When you're bitten, you hear a bite sound. Swat the mosquito in time, and you hear its last gasp. You never know where the mosquito will land, so you have to concentrate and be fast!

GUNFIGHTER

This computerized game (Fig. 11-2) from Bandai Electronics is designed to provide either one or two players with arcade-type fun. Compete against the computer or against an opponent, each trying to pick off the other's gunfighter and score as many points as possible.

Move your gunfighter up and down by pressing the action buttons, and try to pick off your opponent by using the fire key. You get one bullet each time you press the key. There are four cacti and one covered wagon. They move at random, protecting the gunfighters. Hit the wagon, and 1 point is deducted from your score. You need three shots to eliminate a cactus. The game speed accelerates as you play.

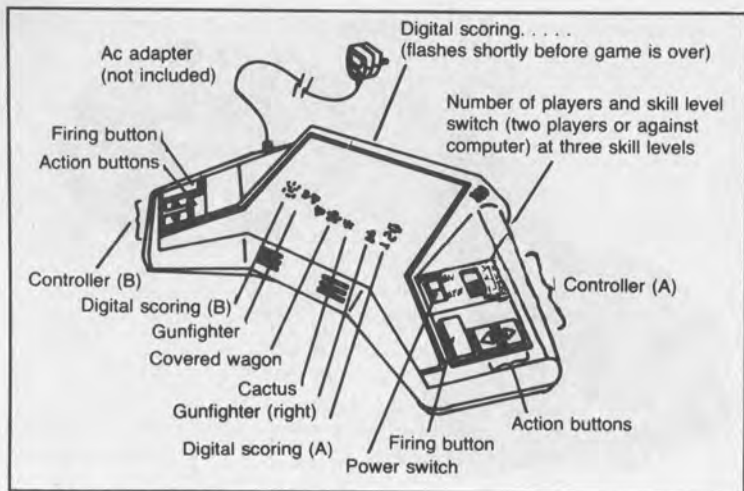


Fig. 11-2. Gunfighter from Bandai Electronics.

DUNGEONS & DRAGONS

This is a computer labyrinth fantasy adventure game (Fig. 11-3) from Mattel Electronics that is played on an electronic touch-sensitive board. Find and steal the dragon's treasure, and you win.

One or two players can go on a perilous, suspense-filled quest through a hidden maze to a treasure guarded by a computer-controlled dragon. The computer also generates the labyrinth that players must solve to discover the location of the treasure, and of the dragon, lurking within three squares of the prize.

During the adventure, as players move their die-cast warriors through the hidden maze, they may hit a wall, producing a representative sound effect. When you're near the treasure, you hear the dragon awakening. He comes flying over the maze walls to defend the treasure, chomping at you and forcing you to retreat to your home sanctuary. The adventure is concluded when you capture the treasure, and there's a victory salute.

RAISE THE DEVIL

This is an electronic pinball machine (Fig. 11-4) from Entex Electronics. It's a handheld arcade game. You play realistic pinball using individually controlled flippers. At the beginning of the game, you have three balls. Use the flippers, and keep the ball in play, scoring points. You can earn up to 999 points. The face value of the points is actually five times the value that is awarded on the digital

display. The LED indicators represent balls, flippers, ball out of play, and raising the devil (Fig. 11-5).

PINBALL

Precisa Products' electronic pinball machine has four flippers and eight bumpers (Fig. 11-6) worth 5,000, 3,000, and 2,000 points. Sound effects are like those in the arcade game. A complete game consists of five balls and five shots per player, with a bonus sixth ball when you score 200,000 for skill 2 and 100,000 for skill 1. Whenever bumpers are hit, they flash until the ball is lost.

WILDFIRE

WILDFIRE (Fig. 11-7) from Parker Brothers, is fully electronic, from flippers and bumpers to scoring and sounds to the moving ball of light. This game keeps score for up to four players at once, and it can be played at three different speeds.

Release the shooter button, and the ball travels up through the firing chute toward the roll-over lanes. You can make the ball travel "soft" or "hard" through the chute; it allows you to aim for a specific roll-over lane. For a "soft" ball, release the shooter button immediately after pressing it. For a "harder" ball, hold the button down a little longer. For the "hardest" ball, hold the button down until the accompanying shooter tone stops playing. By hitting the ball with a flipper, you can control its direction. If you hit the ball



Fig. 11-3. Dungeons & Dragons computerized adventure game (courtesy Mattel Electronics).



Fig. 11-4. Raise the Devil electronic pinball machine (copyright © 1980 by Entex; courtesy Entex Electronics).

early, it goes in one direction. Hit it late, and it goes in another. By pressing the nearer flipper button when your ball is at one of the six nudge points, you can gain extra speed and control. You can direct your ball to a specific roll-over lane by nudging it back and forth within the top arch. Nudging is also useful when you want to maneuver away from the exit lane.

WILDFIRE reacts to overplay, like in a conventional pinball machine. If you press either flipper button more than twice per

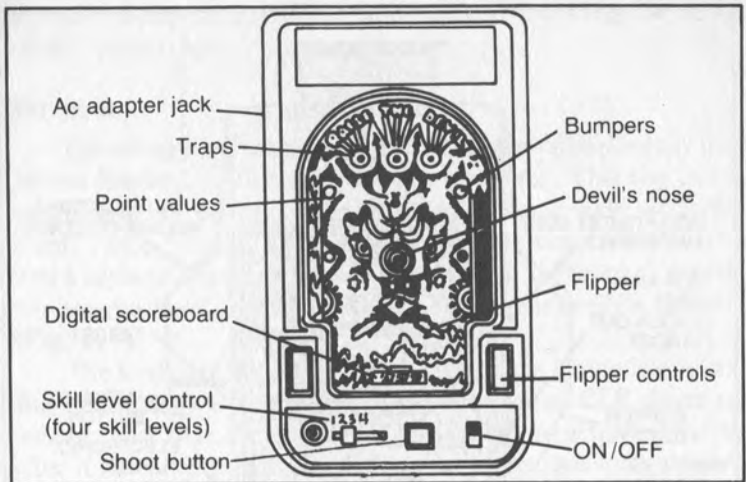


Fig. 11-5. Controls of Raise the Devil pinball game.

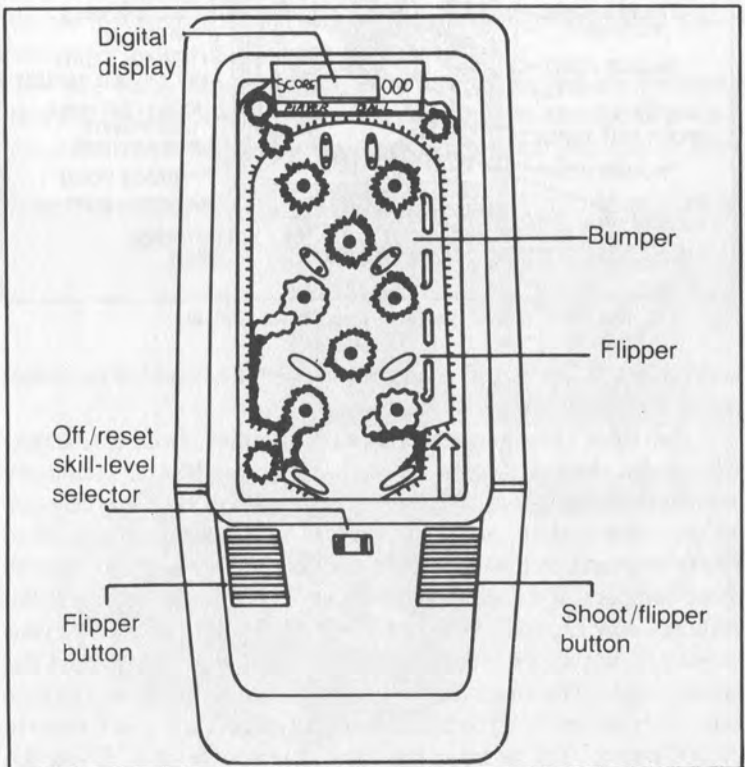


Fig. 11-6. Pinball machine from Precisa Products.

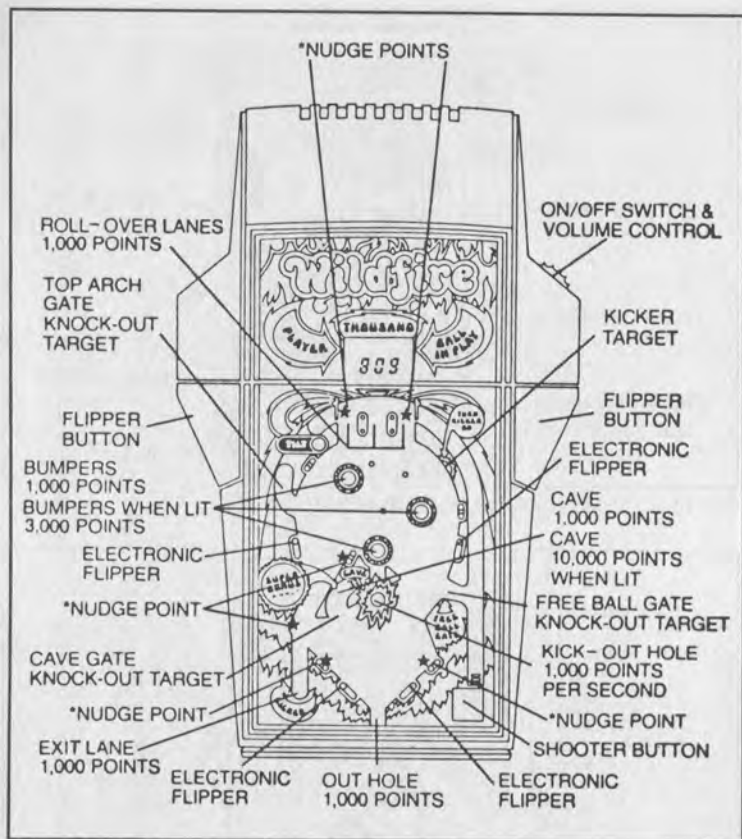


Fig. 11-7. WILDFIRE pinball machine from Parker Brothers.

second, you'll cause a "tilt," and you'll lose the ball and all the bonus points you have scored.

You have a number of scoring opportunities, bumpers, knock-out targets, kicker targets and kick-out hole. Regular points are automatically added to your score during play. Bonus points are added at the end of your turn. You can score bonus points, up to 75,000 per turn, by hitting one of three combinations. Try to light all three bumpers. If you do, you'll receive 15,000 points. Because the bumpers stay lit, you'll also receive 15,000 points on each of your remaining turns. Try to hit all three knock-out targets and the kicker target. The knock-out targets are the free ball gate, top arch gate, and cave gate. If you hit all four on a single turn, you'll receive 20,000 points. Try to enter the cave after you've lit it. If you do, you'll receive 40,000 points. To light the cave, you must first light

all three bumpers and hit all four targets, including the kicker target, on one turn.

BIG TRAK

Operating Big Trak (Fig. 11-8) a computer-controlled toy from Milton Bradley, is like controlling a computer. This toy can be programmed to perform up to 16 different steps, such as “go forward,” “stop,” “turn,” “fire,” and so on. Instructions are entered into a keyboard located on top of the toy. The keyboard directs the toy just as a steering wheel and brake direct your family automobile (Fig. 11-9).

The keyboard has a test button. When this button is pressed, Big Trak travels a factory preprogrammed route. CLR clears any memory that is in the computer. The go button activates the toy after it has been programmed. Four arrow buttons make it move forward, backward, left, or right. The red fire button tells Big Trak to fire its photon beam. The hold button has been designed to tell the toy to wait for a period of time that you have programmed in after one order before it executes its next order.

The RPT, repeat, button is an interesting feature because it lets the toy repeat the programmed sequences exactly. The CLS, clear last step, button becomes very handy when you want to erase



Fig. 11-8. Big Trak computer-controlled toy (courtesy Milton Bradley).

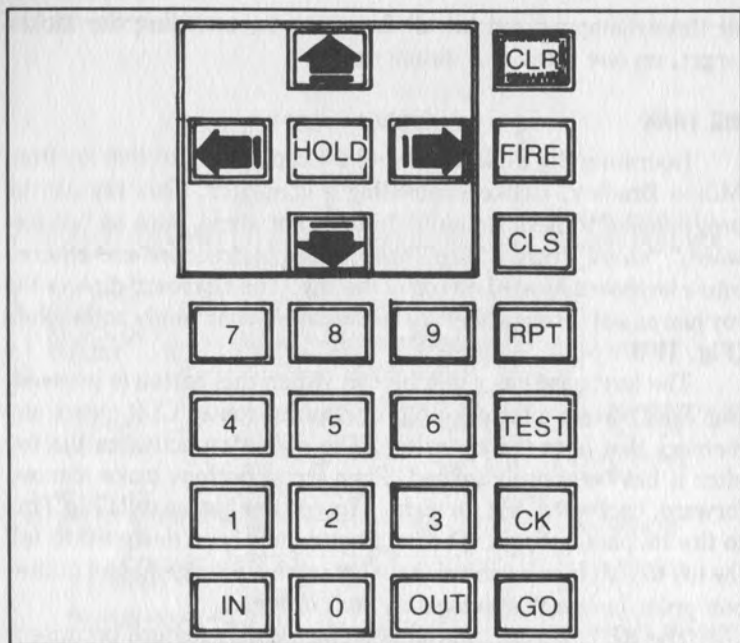


Fig. 11-9. Keyboard for Big Trak computer-controlled toy.

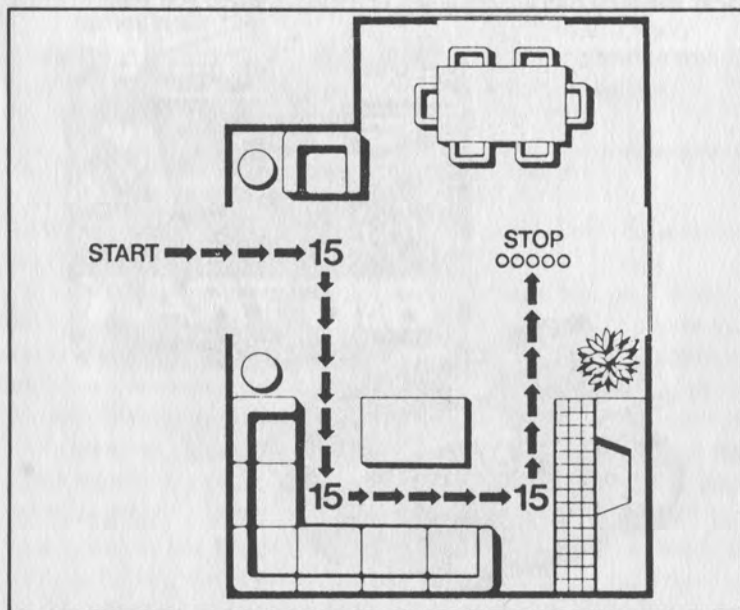


Fig. 11-10. Typical travel pattern of computer-controlled Big Trak toy.

only the last instruction, in case you want to change your mind about a program. The use of this button prevents you from programming the whole sequence over again.

If you want to find out whether your last instruction tells Big Trak to do exactly what you want it to do, press CK (check) to test your instructions before they are fixed into the computer's memory. The IN and OUT buttons are for use with the toy's accessories. OUT is used with the Big Trak Transport.

All instructions, except TEST, CLR, CLS, GO, and CK, require a second step, how far, such as backward or forward, how much to turn, how many shots to fire, how long to hold, and how many steps to repeat. Figure 11-10 illustrates a typical travel pattern of Big Trak.

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