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PRODUCT DESCRIPTION

LOW

ARCADE VIDEO GAME
BASIC PROGRAMMING CARTRIDGE
ZGRASS-100 COMPUTER KEYBOARD

ASTROCADE VIDEO GAME

The ASTROCADE PROFESSIONAL ARCADE has been developed by the leader in commercial arcade games. It is now available from ASTROCADE inc. of Columbus, Ohio.

The industries' most complete line of ROM cartridge software includes the classics: Astro Battle, Football, Tornado, Baseball, Astrocade Pin, and many more. Cartridges now in production include the best in sports, space simulations and strategy games. And, of course, the ARCADE is still the ONLY home video game with four built-in games and four player capability.

MORE CONTROL, COLOR, SOUND EFFECTS

The ARCADE gives you more control over the action because it is the only video game with 8-way hand controls. Joysticks, knob and trigger allow software designers to create more interactive games with more kinds of motion. These games and other programs on the ARCADE are more colorful, too, because the complete color spectrum is available with 256 color choices. The tunes and realistic gunshots are created with a three-channel music synthesizer and sound effects generator. These features allow professional designers to create better software on the ARCADE than on other video games.

TRIPLE PROCESSOR SYSTEM

The ARCADE contains three computer processors, operating in parallel for faster motion, better sound, and highest realism on the screen. While other video games use only one, the ARCADE has three processors, costing millions of dollars to develop. Because of this added computing power in the ARCADE, all of the games and other software are more interactive and more fun.

* CPU or central processing unit is the powerful Z-8Ø processor chip, operating at 1.8 mHz. In addition to the central computer, two custom processors are used in this unique combination.

* VIDEO PROCESSOR, designed specifically for the ARCADE and for Astrocade's professional arcade systems, operates at 7 mHz and increases the animation speed 2Ø times. This custom LSI chip handles all color manipulation for better animation effects. With this extra processor, the ARCADE is the only video game with professional, American standard NTSC video output for sharper images on your TV screen and full compatibility with all video recorders and broadcast equipment.

* I/O PROCESSOR, another custom chip, handles the joystick and keypad inputs and creates the sound effects. Full input control includes up to four 8-way joysticks with trigger, four analog to digital converters, and 24 key-keypad. This chip also creates the special music and sound effects. Three separate sound synthesizers with both AM and FM noise and a frequency range from 2 Hz to 1ØØ kHz provide the most flexible sound system available in any video game.

UNIQUE 8K ROM LIBRARY

A library of special software effects are built into the 8K ROM, furnished with every ARCADE. These software routines for color and sound effects are used with all ARCADE plug-in games. Included in the ROM are the classics: Gunfight and Checkmate. This ROM also contains Scribbling and the Calculator.

EXPANDS TO BASIC COMPUTER, AND MORE . . . .

You can expand the ARCADE two ways. Add the ASTROCADE BASIC cartridge and turn your ARCADE into a BASIC computer you program yourself. Or choose the Zgrass-100 expansion, and your ARCADE becomes the most powerful personal graphics computer available today.

ASTROCADE BASIC PROGRAMMING SYSTEM

There's no easier way to learn about computers than with the new Astrocade BASIC system. This plug-in cartridge with built-in audio tape interface converts your ARCADE into a personal computer you can program yourself. The Astrocade BASIC manual, using a step-by-step self-teaching system, helps you learn programming while you create computer games, electronic music, and video art. The library of BASIC software on inexpensive cassettes expands these applications, and teaches more advanced programming techniques.

EASIEST BASIC TO LEARN

This version of BASIC is ideal for learning about computers because you can easily program colors and shapes, music, and sound effects. Simple words like LINE and BOX make drawing on the screen simple and direct. You can select from 256 possible combinations in picking each of the two colors on the screen. The built-in music system converts the keypad into a 3-octave music keyboard, including sharps and flats. You can also create space sounds and other effects by controlling the synthesizer directly in your programs.

NEW FEATURE FOR 1981-1982

Four new features make Astrocade BASIC more powerful and even easier to use. The audio tape interface is now built into the cassette and operates at 2ØØØ baud. An editor, second array, and a trace command have been added to the language.

* AUDIO CASSETTE INTERFACE lets you save or load programs with your cassette tape recorder. You can load a program in only 16 seconds; and multiple programs may be stored on a single cassette. A standard recorder and an audio cable (Mini phone plug to mini phone plug with a shielded cord) are the only additional equipment required.

* LINE EDITOR makes it easy to change or modify any line in your program without retyping the complete line.

* TWO ARRAYS simplify storing and retrieving information. The @ array and the * array are used for assembly data.

* TRACE FEATURE makes it easy to understand software by showing you exactly what each line in a program does. As each line is executed it is also printed on the screen.

HIGHLIGHTS OF ZGRASS COMMANDS:

GRAPHICS COMMANDS (PRIMITIVES):

BOX 0,0,30,40,1
PUTS A BOX 30 PIXELS (DOTS) WIDE AND 40 PIXELS WIDE IN THE CENTER OF THE SCREEN USING COLOR 1.

CIRCLE 0,0,30,1,2
PUTS A SOLID (1) CIRCLE IN THE CENTER OF THE SCREEN WITH A DIAMETER OF 30 PIXELS USING COLOR 2.

ELLIPSE 45,0,0,140,30,1,3
PUTS A SOLID (1) ELLIPSE 140 PIXELS WIDE AND 30 PIXELS TALL IN THE CENTER OF THE SCREEN AND ANGLES THE ELLIPSE 45 DEGREES USING COLOR 3.

LINE 45,45,1
DRAWS A LINE TO THE UPPER RIGHT HAND AREA OF THE SCREEN.

GRAPHICS COMMANDS (MANIPULATION):

SNAP BALLOON,0,0,50,50
SAVES A PICTURES, CALLED BALLOON, OFF THE SCREEN. THE AREA SAVED IS IN THE CENTER OF THE SCREEN AND IS 50 PIXELS WIDE AND 50 PIXELS HIGH.

DISPLAY BALLOON,40,0,0,2
DISPLAYS THE "SNAPPED" PICTURED CALLED BALLOON AND PUTS THE CENTER OF THE SNAP 40 PIXELS TO THE RIGHT OF CENTER SCREEN. THE LAST NUMBER (2) INDICATES THAT THE PICTURE IS TO BE ROTATED 180 DEGREES.

SCALE .5,2,BALLOON,0,0,0
CHANGES THE SIZE OF THE SNAP BALLOON SO THAT IT IS ONE-HALF THE WIDTH AND TWICE THE HEIGHT OF THE ORIGINAL "SNAP" AND THEN DISPLAYS IT IN THE MIDDLE OF THE SCREEN. SCALED SNAPS CAN BE ROTATED TOO.

SHRINK .5,.5,LITTLE BALLOON,0,0,50,50
SHRINKS THE IMAGE BEFORE MAKING THE SNAP NAMED LITTLEBALLOON. THE ORIGINAL IMAGE WAS 50x50 PIXELS AND THE NEW SNAP IS 25x25.

GRAPHICS COMMANDS (SCREEN):

WINDOW.BOX 0,0,40,40
ONLY ALLOWS THINGS TO BE DRAWN WITHIN AN AREA 40 PIXELS WIDE AND 40 PIXELS HIGH LOCATED IN THE CENTER OF THE SCREEN.

SCROLL 0,0,40,40,2,2,0,1
MAKE AN AREA 40x40 AND LOCATED IN THE CENTER OF THE SCREEN SCROLL 2 PIXELS OVER AND 2 PIXELS UP EACH TIME THIS COMMAND IS ISSUED (USUALLY IN A LOOP) AND FILL THE VACATED AREA WITH COLOR 1.

WRAP 0,0,40,40,2,0
MAKE AN AREA 40x40 AND LOCATED IN THE CENTER OF THE SCREEN MOVE 2 PIXELS OVER AND 2 PIXELS UP EACH TIME THIS COMMAND IS ISSUED (USUALLY IN A LOOP) AND BRING THE PART OF THE IMAGE THAT MOVES OFF THE RIGHT SIDE OF THE AREA BACK ONTO THE LEFT SIDE (OR "WRAP" THE AREA.)

FILL 0,0,2
FILL IN A BORDERED AREA WITH COLOR 2.

PATTERN 0,0,2,2,BALLOON
FILL IN A BORDERED AREA WITH A PATTERN CREATED BY REPEATING THE SNAP NAMED BALLOON. OFFSET THE PATTERN 2 PIXELS TO THE RIGHT AND TWO PIXELS UP.

ZGRASS-100

HARDWARE SPECIFICATIONS:

NOTE: THE FOLLOWING SPECIFICATIONS ARE IN ADDITION TO THOSE FEATURES LISTED AS PART OF THE ARCADE SPECIFICATIONS (THREE-VOICE MUSIC, ETC.) WHICH CARRY OVER TO THE FULL ZGRASS COMPUTER.

1. 32K ROM ZGRASS OPERATING SYSTEM

2. CP/M* COMPATIBLE

3. MEMORY SIZE . . . . . 100K BYTES
   SYSTEM ROM 32K
   SCREEN RAM 4K
   USER RAM 64K

4. TWO (2) RS232 SERIAL PORTS TO INTERFACE A VARIETY OF PERIPHERALS, SUCH AS PRINTERS, MODEMS, PLOTTERS, GRAPHICS TABLETS AND TERMINALS.

5. SERIAL PORT BAUD RATE . . . . . 50 to 19,200

6. 2000 BAUD DUAL CASSETTE TAPE INTERFACE WITH 2 DC MOTOR CONTROLLERS FOR STARTING AND STOPPING RECORDERS UNDER PROGRAM CONTROL.

7. SCREEN RESOLUTION 160x100
   16,000 INDIVIDUALLY ADDRESSABLE PICTURE POINTS (PIXELS)

8. 256 COLOR BIT-MAPPED DISPLAY (FOUR COLORS AT ANY ONE POINT ON THE SCREEN FROM A PALETTE OF 256.)

9. OPTIMIZED COLOR-CODED KEYBOARD WITH FULL CURSOR CONTROL.

10. STANDARD INTERLACED TV SIGNAL FOR COLOR VIDEO RECORDING.

11. OPTIONAL DISK DRIVE INTERFACE AVAILABLE.

CP/M IS A RESIGTERED TRADEMARK OF DIGITAL RESEARCH, INC.

The ASTROCADE ARCADE, ASTROCADE cartridge, Zgrass-1ØØ computer and complete software support are marketed by ASTROCADE.

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ZGRASS-100 COMPUTER EXPANSION

THE ZGRASS-100 EXPANSION PLUGS INTO THE ARCADE TO GIVE YOU A FULL TYPEWRITER KEYBOARD WITH EXPANDED MEMORY. THE MEMORY CAPACITY OF THE ASTROCADE PROFESSIONAL ARCADE WITH THE ZGRASS-100 EXPANSION IS 32K ROM, 4K SCREEN RAM AND 64K USER RAM BRINGING THE TOTAL MEMORY TO 100K. THE 32K ROM CONTAINS THE POWERFUL ZGRASS SYSTEM SOFTWARE THAT MAKES THIS THE EASIEST COMPUTER TO LEARN AND USE. THE 4K SCREEN RAM PROVIDES DYNAMIC STORAGE OF THE SCREEN IMAGE. AND, THE 64K RAM GIVES YOU MORE SPACE FOR CREATING AND STORING PROGRAMS AND PICTURES.

THE ZGRASS OPERATING SYSTEM HAS BEEN DESIGNED TO TAKE FULL ADVANTAGE OF ALL THE HARDWARE POWER OF YOUR ARCADE'S UNIQUE THREE-PROCESSOR SYSTEM. WITH THE ZGRASS-100 EXPANSION, YOUR ARCADE BECOMES THE IDEAL PERSONAL COMPUTER AND THE MOST POWERFUL SYSTEM AVAILABLE FOR CREATING FAST-ACTION GAMES, VERSATILE EDUCATIONAL AIDS AND COLORFUL ANIMATED GRAPHICS.

EASIER TO USE:

ZGRASS IS A LEAP BEYOND BASIC, FORESHADOWING A NEW GENERATION OF EASIER TO LEARN COMPUTER LANGUAGES. PROGRAMS ARE BUILT IN COMPACT MODULES USING FAMILIAR SOUNDING COMMANDS SUCH AS BOX, LINE, CIRCLE AND ELLIPSE. THESE AND THE OTHER 'COMMON SENSE' ZGRASS COMMANDS ARE DESIGNED TO MAKE THIS COMPUTER AN EASY TO USE TOOL FOR ARTISTS, TEACHERS, BUSINESSMEN AND HOBBYISTS WITH LITTLE OR NO PROGRAMMING EXPERIENCE.

EXPANDABLE LANGUAGE:

THE VERSATILITY OF ZGRASS IS UNRIVALED BECAUSE THE LANGUAGE LITERALLY HAS NO BOUNDS. WHILE THE MOST COMMONLY USED ZGRASS COMMANDS ARE CONTAINED IN THE 32K SYSTEM ROM, OTHER SPECIALIZED OR LESS COMMONLY USED COMMANDS CAN BE ADDED TO THE OPERATING SYSTEM AT ANY TIME FROM TAPE OR DISK. THIS MEANS THAT NEW COMMANDS WILL BE CREATED AS THE NEED FOR THEM DEVELOPS. ASSEMBLY LANGUAGE PROGRAMMERS CAN EVEN CREATE THEIR OWN PERSONAL COMMANDS.

SCIENTIFIC MATH ACCURACY:

THE MATH FUNCTIONS INCLUDED IN THE ZGRASS-100 MAKE THIS COMPUTER IDEAL FOR SCIENTIFIC APPLICATIONS. UNLIKE MANY OTHER PERSONAL COMPUTERS, THIS SYSTEM CONTAINS THE COMPUTATIONAL POWER AND ACCURACY REQUIRED FOR SERIOUS CALCULATIONS. AT LEAST 10 TIMES FASTER THAN PROGRAMMABLE SCIENTIFIC CALCULATORS, THIS SYSTEM MAINTAINS 13 DIGIT ACCURACY.

THE FULL MATH PACKAGE INCLUDES: SINE, COSINE, TANGENT, ARCTAN, POWER, SQUARE ROOT AND THE ABILITY TO DEFINE ANGLES IN DEGREES OR RADIANS. WHILE YOU MAY NEVER NEED ALL THIS COMPUTING POWER, ITS NICE TO KNOW THAT BEHIND THE MOST COMPLICATED HOME OR BUSINESS CALCULATIONS.

FULL SCREEN EDITING:

ONE OF THE MOST USEFUL FUNCTIONS ANY COMPUTER CAN BE ASKED TO DO IS THE PREPARATION OF MEMOS, LETTERS AND MANUSCRIPTS. THE FULL-SCREEN EDITOR INCLUDED WITH THE ZGRASS OPERATING SYSTEM WAS DESIGNED PRIMARILY TO SAVE TIME AND ENERGY ENTERING AND CORRECTING PROGRAMS. BUT, IT COMPARES VERY WELL WITH SOME OF THE EDITORS FOUND IN EXPENSIVE OFFICE WORD PROCESSORS. LINES AND INDIVIDUAL CHARACTERS CAN BE TYPED, CHANGED, INSERTED, DELETED, MOVED AND COPIED QUICKLY AND EASILY. COMMONLY USED PARAGRAPHS CAN BE INDIVIDUALLY SAVED AND JOINED WITH NEW MATERIALS TO SPEED UP THE PROCESS OF WRITING REPLY LETTERS. IT IS EVEN POSSIBLE TO AUTOMATICALLY SEARCH FOR SPECIFIC WORDS OR PHRASES AND REPLACE THEM IF NECESSARY. GOING FROM ROUGH TO FINAL DRAFT ON HOMEWORK AND TERM PAPERS WILL BE A LOT EASIER WITH ZGRASS.

MULTI-PROGRAM EXECUTION:

MOST COMPUTERS CAN RUN ONLY ONE PROGRAM AT A TIME. THE ZGRASS-100 HAS FOREGROUND AND BACKGROUND PROCESSING CAPABILITIES. THIS MEANS THAT SEVERAL PROGRAMS CAN BE RUNNING AT ANY ONE TIME. FOR INSTANCE, A PROGRAM THAT CHECKS A DOOR ALARM COULD BE RUNNING AT THE SAME TIME A GAME PROGRAM IS BEING PLAYED.

NOTE TO PARENTS: THIS FEATURE CAN BE USED TO KEEP TRACK OF TIME AND AUTOMATICALLY END A GAME AT BEDTIME!

NETWORK COMMUNICATIONS:

FROM STOCK REPORTS AND BANK BALANCES TO NEWS AND WEATHER, THE ZGRASS-100, WITH THE OPTIONAL MODEM, CAN HELP KEEP YOU UP-TO-DATE BY BEING YOUR WINDOW TO THE LARGE DATABASES AVAILABLE TO PERSONAL COMPUTER OWNERS. TWO RS232 PORTS ARE STANDARD EQUIPMENT FOR THE ZGRASS-100. THIS MEANS THAT A PRINTER CAN BE ATTACHED TO THE COMPUTER WHILE A MODEM IS BEING USED. VALUABLE INFORMATION CAN BE RETRIEVED AND PRINTED OUT FOR YOU TO STUDY AT YOUR LEISURE.

CP/M COMPATABILITY:

THE ZGRASS-100 IS COMPATABLE WITH THE CP/M DISK OPERATING SYSTEM POPULAR WITH BUSINESSES AND BUSINESS SOFTWARE PRODUCERS. THIS OPTION ALLOWS YOU ACCESS TO HUNDREDS OF PROGRAMS FROM A VARIETY OF VENDERS. MOST OF THE BEST BUSINESS ACCOUNTING AND SOFTWARE PACKAGES ARE WRITTEN IN CP/M. CP/M ALSO WILL ALLOW YOU TO USE DIFFERENT LANGUAGES SUCH AS FORTRAN AND EXTENDED BASIC.

OTHER ZGRASS LANGUAGE FEATURES:

*FULL STRING MANIPULATIONS INCLUDING MATCH, CONCATENATION, REPLACE, ETC.

*MULTI-DIMENSIONAL ARRAYS.

*BOTH INTERPRETED AND COMPILED (FASTER) MODES.

*FULLY AUTOMATIC STORAGE ALLOCATION AND RECLAMATION.

*AUTOMATIC TYPE CONVERSION BETWEEN INTEGER, FLOATING AND STRINGS.
NO NEED TO DECLARE VARIABLE TYPES.

*WELL DOCUMENTED ERROR MESSAGES.

VIDEO GAME FEATURE COMPARISON

	BALLY PROFESSIONAL ARCADE	APF MP-1000	ATARI VIDEO GAME	MAGNAVOX ODYSSEY 2	MATTEL INTELLEVISION GAME
Four joystick capability input	*				
Built-in Games	*	*			
Built-in Calculator	*				
Built-in Keypad	*	*		*	*
Multi TV Channel Select	*		*		*
Removable Hand Controls	*		*		
Remote Game Selections	*	*			
Multi Processors	*				
Full Keyboard Expansion	*	*			*
Cartridge Storage Bin	*				
Basic Programming Cartridge	*		*	*	*
Built-in Basic Keypad	*			*	
Cassette Program Storage	*				
Pre-programmed audio cassettes	*				
Light Pen Connector	*				

COMPUTER FEATURE COMPARISON

	Zgrass	Atari 8ØØ	TRS - 8Ø Color	T.I. 99/4	Apple II
Ram included	64K	16K	4K	16K	16K
Ram Expands to	N/A	48K	16K	16K	64K
Rom included	32K	16K	8K	26K	12K
Plug-in Rom Cartridge	8K	16K	16K	3ØK	N/A
Floppy Disk Expansion	Extra	Extra	Extra	Extra	Extra
Light Pen Expansion	Incl.	Extra	Extra	Extra	Extra
RS - 232	2 Incl.	Extra	Incl.	Extra	Extra
Languages Supplied	Zgrass	Basic	Basic	Basic	Basic
Screen Resolution*	16Ø x 1ØØ	38Ø x 192	128 x 96	192 x 256	28Ø x 192
Color Choices for Highest Resolution	256	128	8	16	6
Colors Displayed	4/designated screen, 64 area total	16	4	16	16
Broadcast Quality Vidio	Yes	No	No	No	No
Music Synthesizer	3 voice	4 voice	1 voice	3 voice	1 voice
Voice Synthesizer	Extra				
Extended Precision Math Package	Yes	No	No	Yes	No
Audio Cassette Interface	Dual	Single	Single	Dual	Single
Number of Processors and Type	3 Z-8Ø Vidio,I/O	2 65Ø2 Vidio	1 68Ø9E	1 TMS99ØØ	1 65Ø2
Inputs	8 - way Joystick Analog Button	8 - way Joystick Analog Button	2 - way Joystick Analog Button	2 - way Joystick Analog Button	2 - way Joystick Analog Button
CP/M**Compatable	Yes	No	No	No	No
Full Screen Editor	Yes	Yes	No	No	No

*with Standard Memory Supplied
**Trade Mark of Digital Research Inc.