ALTERNATIVE ENGINEERING CORP.

P. O. BOX 128 - GARDINER, MAINE 04345
(207) 623-8506

THE VIPER-ZGRASS SYSTEM

With over 10 years of custom software development,plus the most
advanced hardware features ever offered on a home computer,the
Viper Z-grass system has become the most powerful,yet affordable
Video Image Processor on the consumer market.This unique system
together with the Bally/Astrocade Professional Arcade has a total
of 8 microprocessor devices including 3 original Bally/Midway
custom graphics processors.(used to make such videogame legends as
Pac Man, Galaxians,Wizards of War,Space Invaders,and many others.)
Many other home computers can play arcade games,but the Z-grass
computer system is the first machine specially designed for
writing them.Z-grass makes it fun and easy to create your own
arcade games,video art,graphs,charts,synthesized music,plus
special sound effects.Almost everyone has ideas for video games
but only now with Z-grass can put your thoughts in motion without
having to be a master programmer.

SYSTEM FEATURES:

1. 64K 200ns DYNAMIC RAM MEMORY FOR PROGRAMMING.

2. 32K CUSTOM Z-GRASS REAL TIME OPERATING SYSTEM.

3. DUAL RS232 BI-DIRECTIONAL,COMMUNICATIONS PORTS.

4. 8048 MICROPROCESSOR CONTROLLED KEYBOARD WITH 1K ROM DECODER.

5. OAK F.T.M. 81 KEY COMPUTER DESIGNED KEYBOARD WITH KEYPAD.

6. PIEZO ELECTRIC KEY CLICK FOR AUDIBLE KEYBOARD FEEDBACK.

7. 8231 HIGH SPEED ARITHMETIC PROCESSOR UNIT.

8. DUAL 2000 BAUD CASSETTE INTERFACE PORTS WITH MOTOR CONTROL.

9. DOUBLE SIDED/DOUBLE DENSITY 5.25 FLOPPY DISK CONTROLLER.

10. RFI/EMI FILTER WITH PLUG IN CORD AND BUILT IN FUSE.

11. FULLY REGULATED DC POWER SUPPLIES 5,12,-12.

12. RS232-MICROPROCESSOR CONTROLLED REMOTE KEYBOARD OPTION.

13. EXPANDABLE TO HIGH RESOLUTION GRAPHICS.(320*204-COLOR)

14. MEMORY EXPANDABLE UP TO 256K WITH THE HIGH RES.OPTION.

15. STEREO OUTPUT JACKS FOR THE 3 OCTAVE MUSIC SYNTHESIZER.

16. COMPATIBLE WITH CP/M OPERATING SYSTEMS.

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The Viper Z-GRASS unit plugs into all of the following systems:

THE BALLY HOME LIBRARY COMPUTER

THE BALLY PROFESSIONAL ARCADE

THE BALLY COMPUTER SYSTEM

ASTROCADE PROFESSIONAL ARCADE COMPUTER

ASTROVISION PROFESSIONAL ARCADE COMPUTER

Z-GRASS THE LANGUAGE.

The Z-GRASS software includes these advanced functions:

1. A FULL SCREEN TEXT EDITOR FOR FAST EFFICIENT PROGRAM EDITING.

2. STRING MANIPULATION INCLUDING MATCH,CONCATENATION REPLACEMENT.

3. PROGRAM EXECUTION IN BOTH INTERPRETED AND COMPILED MODES.

4. MULTI-DIMENSIONAL ARRAYS AND STRING ARRAYS.

5. USER CUSTOMIZATION OF LANGUAGE AT SEVERAL LEVELS.

6. ADVANCED GRAPHICS COMMANDS:

SHRINK,TEXT,ELLIPSE,SNAP,SHOW,ROTATE,SCALE,PATTERN,STRIPE,POINT.

7. 6 USER DEFINABLE KEYS FOR SPECIAL OR REPITITIOUS FUNCTIONS.

8. OVER THIRTY SPECIAL CONTROL KEY COMMANDS WITH MULTIPLE MODES.

This is only a partial list of all the commands that are included
in the 32K of Z-GRASS software.It takes over 100 pages of the
Z-GRASS manual to describe all the commands and how to use
them.Also included in the Z-GRASS manual are 10 demonstration
lessons in programming with Z-GRASS, plus information on all the
swap modules that can be bought on disk or cassette tape.These
swap modules allow the user to get new Z-grass commands as they
become available.

DUAL RS232 COMMUNICATIONS PORTS.

The RS232-C dual channel communications ports allow your Viper to communicate with the outside world.These ports can be used with a wide variety of the latest in communications equipment and both channels have independant programmable baud rates.(300 to 38.4k baud)The following devices can be used with these ports.

1. PRINTERS, DOT MATRIX OR LETTER QUALITY.

2. BIT PAD GRAPHICS DIGITIZERS.

3. VOICE SYNTHESIZERS.

4. TELEPHONE MODEMS.

5. REMOTE APPLIANCE CONTROLLERS.

6. COMPUTER TERMINALS.

7. OTHER Z-GRASS COMPUTER SYSTEMS.

8. REMOTE KEYBOARDS.

MICROPROCESSOR CONTROLLED KEYBOARD

The Microprocessor controlled keyboard is a state of the art high speed data entry device.This unique keyboard features an 8 character buffer,repeat key,and microprocessor based multiple key rollover functions with phantom key lockout.All keys are debounced to prevent unwanted entries.The keyboard has 4 level coding, Shift,Unshift,Capslock,and Control.There are 81 keys in the standard QWERTY arrangement and the life expectancy per key is a 100 million cycles.The switch contacts are front sealed,therefore humidity,dust and vibration have no effect on proper operation.The top row of keys have been customized for the Z-grass computer system yielding us F1 thru F6 for the special function keys and four arrow keys for the Z-grass editor.Also included in the system is a piezo-buzzer that clicks each time a key has been depressed to give the user a positive entry response.This buzzer can also be program controlled and made to click either in response to or,to gain the attention of,the programmer.

ARITHMETIC PROCESSING UNIT.

The Arithmetic Processor is an integral part of the high speed
graphics that Z-grass is capable of producing.This device is
standard equipment on the Viper but is normally offered as an
option costing several hundred dollars on other computers
systems.The APU increases the speed of the mathematical
computations up to several hundred times and is therefore
essential in producing the real time responses needed for complex
graphics simulations.

FUNCTIONS:

1. FIXED POINT SINGLE AND DOUBLE PRECISION. (16/32 bit)

2. FLOATING POINT SINGLE PRECISION. (32 BIT)

3. FULL BINARY DATA FORMATS.

4. ADDITION,SUBTRACTION,MULTIPLICATION AND DIVISION.

5. TRIGONOMETRIC AND INVERSE TRIGONOMETRIC FUNCTIONS.

6. SQUARE ROOTS, LOGARITHMS,EXPONENTIATION.

7. FLOAT TO FIXED AND FIXED TO FLOAT CONVERSIONS.

8. STACK ORIENTED OPERAND STORAGE.

Fortunately all of the above mathematical formulas are executed
transparently to the user and are completely controlled by the
Z-grass software.This device has been manufactured using the most
advanced N-Channel Silicon Gate Technology and therefore is
extremely fast and reliable.

2000 BAUD DUAL CASSETTE INTERFACE WITH MOTOR CONTROLS.

The Dual 2000-Baud Cassette Interface is used to store and
retrieve programs from a cassette recorder.The system includes 2
separate cassette ports with individual motor controls.Having 2
separate systems allows more complex functions to be easily
executed.With the computer controlling the motors,one cassette
could be the audio instructions,while the other is loading program
material into the computer.The dual motor controls can also be

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used to let the computer start and stop the cassettes to merge
files or select audio or program data.

5.25 4 CHANNEL FLOPPY DISK CONTROLLER.

The WD1770/ 5.25 Floppy Disk Controller/Formatter from Western
Digital is the latest in floppy disk technology.This controller
contains a digital data separator and write precompensation
circuitry to insure optimum data integrity to and from,the disk.
This 5.25 floppy disk controller is capable of driving up to 4
single or double sided/double density disk drives.The total
ammount of memory capable of being accessed using double sided,
double density mode with the IBM MFM format would be approximately
1.5 million bytes.
The Z-grass software is programmed for double density formatting
in order to get the most memory storage per disk.Although this
floppy disk controller is a custom version for 5.25 disk drives it
maintains complete compatability with its predecessors and
therefore can be connected to all standard 5.25 disk drives.

POWER SUPPLY FEATURES.

The system power sections include 1 switched 120v 3 prong grounded
outlet on the back panel to be used for the Bally/Astrocade wall
transformer.This outlet will turn your Bally/Astrocade unit on and
off with the Viper Zgrass unit.The front panel on/off switch is
illuminated for your convenience and is a good quick reference to
insure whether the system is on or off.
In an effort to diminish the effects of low voltage and power
spikes causing computers to intermittently fail, the Viper has a
specially designed microprocessor power transformer that is
capable of operating at 100% efficiency even when the power lines
drop well below 110 volts.To help protect the system from radiated
noise the the Viper also includes a high efficiency RFI/EMI AC
line filter with fuse compartment,and the addition of a
M.O.V.(metal oxide varistor) for Hi-Voltage spike protection.

AUDIO MIXING AND STEREO OUTPUTS.

With the Viper Z-grass system you can use either your TV or your
stereo sound system to listen to the sound effects of the music
synthesizer.You can also play your cassette recorder thru the TV
or stereo system thanks to a special circuit in the Viper.With
this unique flexibility you have complete voice and music
capability for Computer Aided Instruction,Adventure games,and many

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other applications where high quality sound and programs can interact.