

**ELECTRONIC SYSTEMS**  
P.O. Box 21638, San Jose, CA 95151 (408) 448-0800

# Computer Products

**1980**  
Mail Order  
**LOWEST PRICES**  
Save your gas, time and money.

# APPLE HARDWARE

APPLE HARDWARE

## APPLE II OR APPLE II PLUS



**Color Graphics** 15 colors—40H x 48V array **Audio** Built-in speaker, accessible from BASIC or ASSEMBLY language. **Basic and Monitor in ROM** Extended Basic. **High Resolution Graphics** 280H x 192V array. **Lightweight Portability** Less than 12 pounds. **Expandable** Up to 48K Bytes RAM, Up to 12K Bytes ROM, 8 Peripheral Slots, 4 A/D Inputs, Cassette I/O, 2Video Outputs, 7 Single Bit Ports.

16K REGULAR	
A250016	\$974.95
16K PLUS	
A251016	\$974.95
16K WITH 16K E, S, RAM	
A250032	\$1059.95
32K PLUS	
A251032	\$1059.95
48K REGULAR	
A250048	\$1123.95
48K PLUS	
A251048	\$1123.95

## APPLE ACCESSORIES

Auto-Start ROM Package (for Apple II only)	
A2M0027	\$ 65.95
Clock/Calendar Card	
A2M0024	\$199.95
Graphics Tablet (48K RAM/Applesoft Disk II required)	
A2M0029 <sup>(2)</sup>	\$795.95
Language Systems with PASCAL (48K RAM & disk required)	
A2B0006	\$459.95
Applesoft II Firmware Card with Auto-Start ROM	
A2B0009	\$169.95
Integer BASIC Firmware Card with Mon. & Prog. Aid ROMs	
A2B0010 <sup>(2)</sup>	\$169.95
Programmer's Aid #1 ROM (use with Integer BASIC)	
A2M00	\$ 49.95
Vinyl Carrying Case	
A2M0009	\$ 29.95

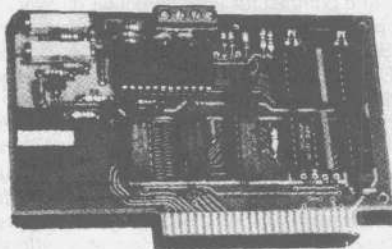
## TAPES AND DISKETTES

The Cashier (retail store management)	
A2D0025	\$239.95
The Controller (general business system)	
A2D0012	\$599.95

## INTERFACE CARDS

Centronics Printer Interface Card	
A2B0007	\$225.95
Communications Card & DB25 Connector Cable	
A2B0003	\$225.95

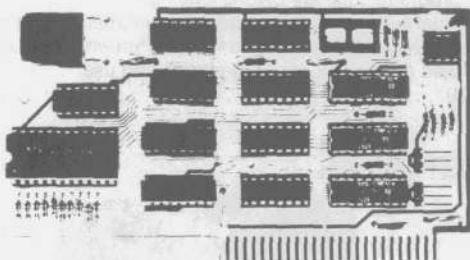
## 3 3/4 Digit BCD A/D Converter



The 7470 allows conversion of a DC voltage to the BCD number for computer monitoring and analysis. Typical inputs would be DC inputs from temperature or pressure transducers. • Selectable interrupt on end of conversion • 200US per conversion • -4 to +4 VDC full scale • Plus or minus .05% non-linearity • Plus or minus 1 count quantization • Input offset adjustment • Floating inputs • Overrange and sign indicators • Input filter • Power down ROM • Supports interrupt daisy chain • Allows DMA daisy chain • 256 byte firmware (ROM) or software (RAM) space available • Correctable offset error • Temperature coefficient adjustment • Calibration adjustment.

7470A ..... \$149.95

## MUSIC SYNTHESIZER



## A COMPLETE LOW COST SYNTHESIZER FOR THE APPLE II COMPUTER

• **THREE SIMULTANEOUS VOICES** Single circuit card contains 3 channels. • High resolution screen displays entered music in traditional sheet-music format. • **FULLY ASSEMBLED AND TESTED** Plugs into any Apple expansion slot. • **COMPLETE, READY TO USE** Comes with manual, software cassette, and audio cable which connects to your home stereo system. • Stereo is available when using 2 or 3 units. • **PITCH, ENVELOPE, AND VOLUME** Easily controlled using software provided with unit. • **EXPANDABLE TO 6 OR 9 VOICES** Use 1, 2, or 3 units for 3, 6, or 9 voices. • **NO "MUSIC LANGUAGES" TO LEARN** Interactive music entry program uses game paddles to position notes on musical staff. • **FULL PIANO RANGE** Eight octaves with 24 notes per octave. • **NO TUNING REQUIRED** Crystal-controlled pitches are accurate to within 2 percent. • **SAVE AND LOAD SONGS** Using cassettes or disk. • **RECREATIONAL** Relative enjoyment factor (REF) typically exceeds 82.

A L F Products Inc.  
ALFMSAP2 ..... \$139.95

**BRIGHT PEN**

• Bright Pen will determine whether or not your video display is of sufficient quality to produce accurate and reliable Bright Pen operation. It will aid you in finding the proper balance between brightness and contrast for your particular display.

What is the difference between a Light and a Bright Pen? Intelligent Software and extensive documentation from SOFTAPE.

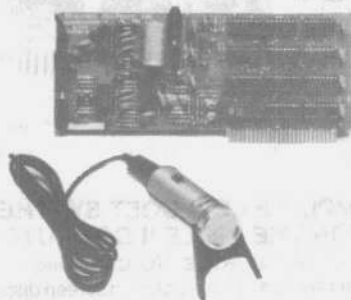
The Bright Pen has been designed as an alternative to keyboard or game paddle input for the Apple II Computer. • Bright Pen software is designed to append to your application program resulting in a single Integer Basic Bright Pen program. • Pen Locator Prefix. General purpose locator that can be appended to a Basic program to allow determination of pen position to nearest lo-res point. Enables you to get pen position into you Basic program to generate data tables effortlessly and much more! • Powerful screen oriented Integer Basic Source Editor. Bright Pen allows for easier and faster editing. Editing time is cut in half. The Editor is in assembly language, but is handled as Integer Basic for storage. Editor commands have been selected for speed and ease of use. • Alternative to keyboard for menu selection, game plays, graphic generation, and more. Fast and effortless. • As an alternative when keyboard input is beyond the sophistication of user. Use in schools from kindergarten on up. Kids can just point to the right answers for fast response. • As an aid to the handicapped when keyboard input is difficult.

These sophisticated programs come complete with documentation for users at every level of technical expertise.

• Includes Control Software and CALIBRATOR • Bright Pen Editing of Integer Basic Programs • Menu Selection Demo • Prefix programs for easy BASIC loading

• A manual that completely guides the user's first programming efforts • 2 Demonstration Tapes • Bright Pen which comes fully assembled and tested, ready to plug in and use.

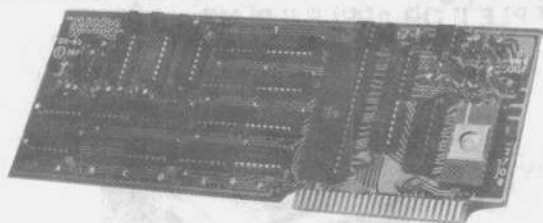
**BPE279** ..... \$34.95

**SUPERTALKER**

**THE SUPERTALKER SYSTEM.** SuperTalker is a new Mountain Hardware peripheral system which allows the Apple II computer to output exceptionally high quality human speech through a loud-speaker under program control. Output may also be directed through any P. A. or stereo system. Initially, spoken words are digitized into RAM memory through the system microphone. Speech data in RAM may then be manipulated like any other stored data.

**GIVE VOICE TO YOUR APPLE.** SuperTalker allows you to add the dimension of human speech output in your computer programs. Add voice to games. Program verbal prompting for the operator of your business system. Use verbal warnings under program control as an enunciator in commercial security or control rooms. Create educational programs that verbally coach the student.

**MHST269** ..... \$269.95

**DIGISECTOR**

The Micro Works DS-65 Digisector® is the first random access video digitizer produced for the Apple II. It converts a TV camera's output into digital information that your computer can process. Since operation is straightforward, you don't have to be a software wizard to utilize the DS-65's extensive capabilities. The DS-65 Digisector features: High Resolution — 256x256 picture element scan; Precision — 64 levels of grey scale; Versatility — accepts either interlaced (NTSC) or industrial video input; Economy — a professional tool priced for the hobbyist.

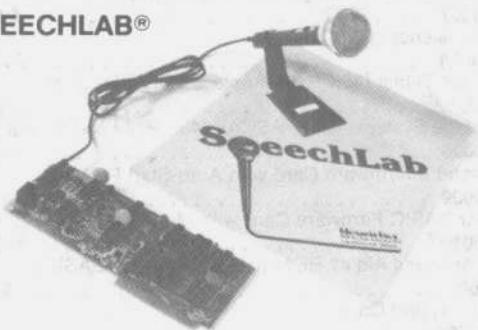
This intelligent Apple peripheral has on-board software in 2708 EPROM, featuring: Full screen scans directly to Apple Hi-Res screen; easy random-access digitizing by Basic programs; line-scan digitizing for reading charts or tracking objects; utility functions for clearing and copying the Hi-Res screen.

The DS-65 Digisector comes fully assembled, tested and burned in. An inexpensive TV camera and the DS-65 are all you'll need to let your Apple see the world!

**DS-65** ..... \$349.95  
ADVANCED VIDEO CAMERA

**FSII** ..... \$299.95  
SPECIAL COMBO PRICE

**DSFS165** ..... \$599.95

**SPEECHLAB®**

• SpeechLab recognizes the spoken word using pattern matching techniques. • SpeechLab provides voice input and control for Apple II. • Use it for data entry to replace keyboard input, quality assurance, control, games and speech research.

**MOD 20**

**20A** ..... \$189.95

**32 WORDS LAB. MAN.**

**20L** ..... \$ 14.95

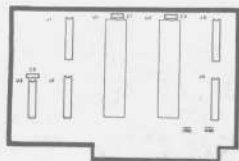
**NOISE CANCELLING MICROPHONE**

**NC-2** ..... \$ 84.95

**64 WORDS & UP MOD H200 SPEECH LINK**

**HURA 32629** ..... \$249.95

## APPLE II PARALLEL INTERFACE

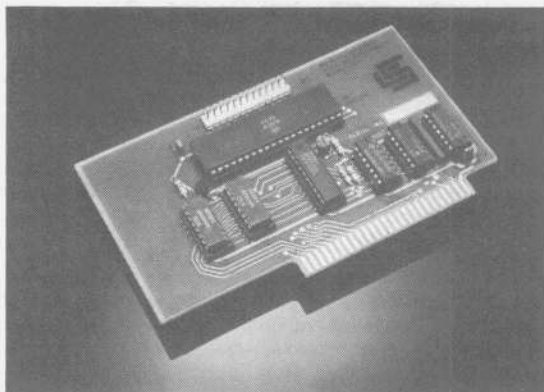


### By John Bell Engineering

Dual 6522 interface, • 32 I/O lines, • 4 timers, • outputs are TTL compatible • Interface keyboards, printers, solid state switches and many other parallel peripherals.

KIT	
79-295K .....	\$ 69.95
ASSEMBLED AND TESTED	
79-295A .....	\$ 79.95

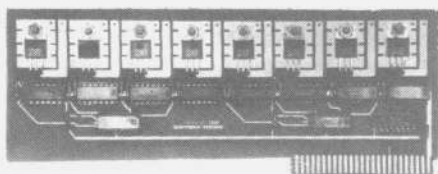
## PARALLEL INTERFACE



Two bi-directional 8 bit buses for interface to peripherals • Two programmable control registers • Two programmable data direction registers. • Four individually controlled interrupt input lines; two useable as peripheral control outputs • Handshake control logic for input and output peripheral operation • High impedance 3 state and direct transistor drive peripheral lines • Programmable interrupts • CMOS drive capability on side A peripheral lines • 2 TTL drive capability on all A and B side buffers • Power down ROM • Supports interrupt daisy chain • Allows DMA daisy chain • 256 bytes firmware (ROM) or software (RAM) space available

7720A .....	\$119.95
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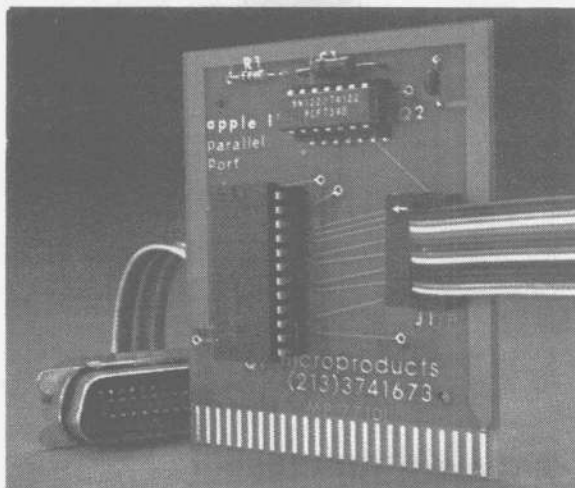
## PARALLEL TRIAC OUTPUT BOARD



This board has 8 triacs capable of switching 110 volt 6 amp loads (660 watts per channel) or a total of 5280 watts.

BOARD	
6210 .....	\$ 15.95
WITH PARTS KIT	
210A .....	\$119.95

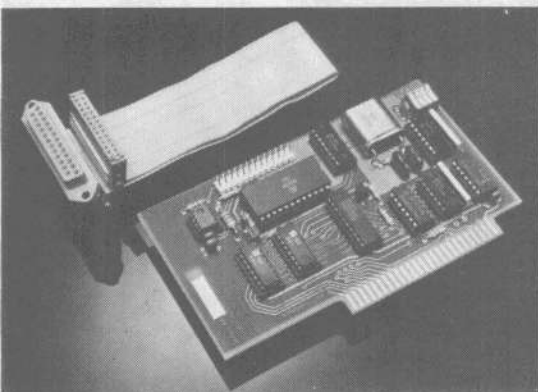
## PARALLEL OUTPUT PORT



Interface is completely assembled, tested and guaranteed. Including: Interconnecting cable, software stored on audio cassette, PC Board which plugs directly into your APPLE II. • Prints one line at a time when return key is pressed. • Ideal for writing programs, as you have a complete permanent record of all changes and deletions to your program. • While in Basic, using the list mode, printer will list the entire program without stopping as the screen scrolls up one line at a time. • You can refer to an earlier part of your program without the necessity of relisting it on the screen. • Printer can be called from Basic to print entire contents of video screen. • When using assembly language mode, one line at a time will be printed in the same format as the video screen.

1005 .....	\$ 39.95
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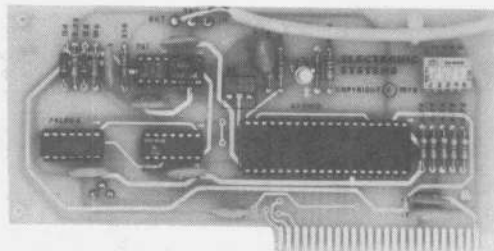
## SERIAL INTERFACE (ASYNCHRONOUS)



• Parity, overrun, and framing error checks • Optional divide by 16 clock mode • False start bit detection • Software programmable interrupts • Data double buffered • One or two stop bit operation • Power down PROM • 256 bytes firmware (ROM) or software (RAM) space available • Supports interrupt daisy chain • DCR type interface • Failsafe RS-232C operation • 14 STD CLK rates 50-19.2K BAUD plus EXT CLK • BAUD rates dip switch selectable • All BAUD rates crystal controlled except EXT • 8 and 9 bit transmission • Optional even, odd, and no parity bit • Programmable control register

8WR077710A .....	\$159.95
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## SERIAL I/O INTERFACE



This serial I/O port is continuously adjustable from 0 to 30,000 baud and plugs into any peripheral connector. Features low current drain, RS232 input and output, and jumper selectable address. On board switch is selectable 5 to 8 data bits, 1 or 2 stop bits, parity or no parity either odd or even. D.T.R. Line

**SOFTWARE:** input and output routine from monitor or Basic to teletype or other serial device; program for using all Apple II for a video or intelligent terminal can output in correspondence code to interface with some selectrics.

BOARD ONLY

2 ..... \$ 14.95

WITH PARTS (KIT)

2A ..... \$ 42.95

ASSEMBLED AND TESTED

2C ..... \$ 62.95

CABLE NOT INCLUDED

## EIA/RS-232 CONNECTOR

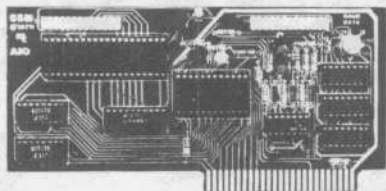


DB25P ..... \$ 6.95

WITH 9 INCH 8 CONDUCTOR CABLE

DB25P9 ..... \$ 10.95

## SERIAL AND PARALLEL INTERFACE



The A10 interface allows maximum flexibility for interfacing an Apple II with peripherals such as printer, plotters, terminals, modems and other computer. The software-programmable serial interface uses the RS-232 standard and includes three handshaking lines. A switch selects nine standard data transmission rates. On-board firmware provides a powerful driver routine that eliminates the need to write any software to utilize the interface. The A10's parallel interface features software programmable I/O ports with enough lines to handle two printers simultaneously with handshaking control.

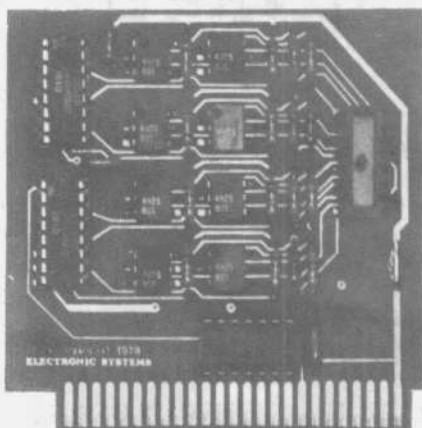
The A10 comes with serial interface firmware, two cable assemblies and a manual with easy to follow application notes. ASSEMBLED AND TESTED

A1055MC ..... \$175.95

KIT

A1085MA ..... \$135.95

## OPTO-ISOLATED PARALLEL INPUT BOARD FOR APPLE II



There are 8 inputs that can be driven from TTL logic or any 5 volt source. The circuit board can be plugged into any of the 8 sockets of your Apple II. It has a 16 pin socket for standard dip ribbon cable connection.

BOARD ONLY

120 ..... \$ 14.95

WITH PARTS, KIT

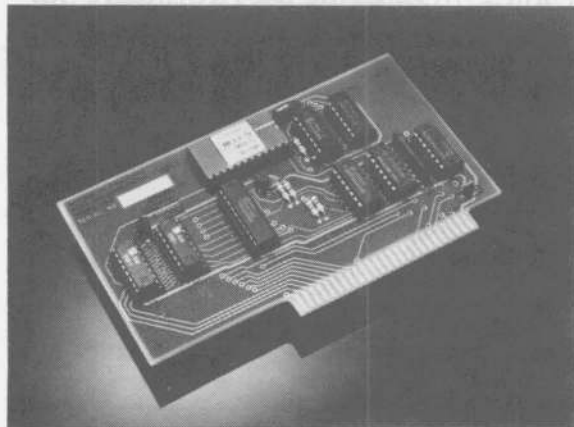
120A ..... \$ 69.95

## EXTENDER BOARD

The 7520A is a handy tool when debugging or testing modules in the Apple II.

7520A ..... \$ 23.95

## ARITHMETIC PROCESSOR



- Based on AMD AM9511 device
- Fixed point 16 and 32 bit operation
- Floating point 32 bit operation
- Binary data formats
- Add, subtract, multiply, and divide
- Trigonometric and inverse trigonometric functions
- Square roots, logarithms, exponentiation
- Float to fixed and fixed to float conversions
- Stack oriented operand storage
- Programmed I/O data transfer
- End signal selectable interrupt
- Supports interrupt daisy chain
- Allows DMA daisy chain
- Power down ROM
- 256 bytes firmware (ROM) or software (RAM) space available

7811B ..... \$399.95

## MICROMODEN II™



**General Description** The Micromodem II is a complete data communications system for your Apple II™ personal computer system combining functions which formerly required a modem, and automatic calling unit, and serial and parallel interfaces.

The result is a sophisticated computer-to-computer or terminal-to-computer modem for use in personal and small business systems.

The Micromodem II provides all the capabilities of a serial interface card and an acoustic coupler, with the addition of programmable automatic dialing and answer. On-board ROM firmware provides for remote console, terminal mode, and simplified implementation of more sophisticated applications with BASIC programs.

The Micromodem II comes with the Microcoupler™, an exclusive new device that allow you to connect your Apple II directly to a modular jack provided by your local telephone company.

**Features** Direct-connect Microcoupler. This FCC-registered device provides direct access into your local telephone system, with none of the losses or distortions associated with acoustic couplers and without a telephone company supplied data access arrangement. The Micromodem II can automatically answer the phone and receive input; it can also dial a number automatically, either from the keyboard or from the BASIC program, and effect the transfer of data. High-performance 110 or 300 baud Bell 103-compatible modem. Supports originate and answer modes. Interactive programming and distributed computing capabilities between your Apple II and another Apple II, or a terminal, another microcomputer, minicomputer, or a large time-sharing computer anywhere in North America, over regular telephone lines.

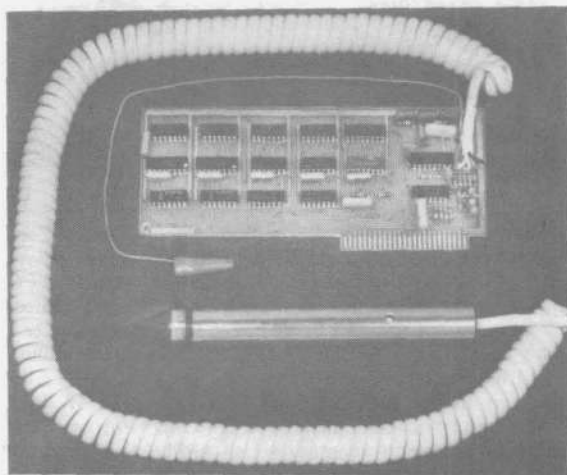
**DCH-A-31745** ..... \$379.95

## PROM MODULE

The **7114A PROM MODULE** permits the addition or replacement of the Apple II firmware without the physical removal of the Apple II ROMS. This allows software/firmware replacement, change, and/or patch to be made on a ROM or BYTE BASIS. An on-board enable/disable toggle switch is also available. • BYTE oriented program overlay • Selectable prom overlay • Power down of PROMS • 14K PROM space available • Uses +5 volt 2716 proms • Allows use of DMA/interrupt daisy chains.

**7114A** ..... \$ 79.95

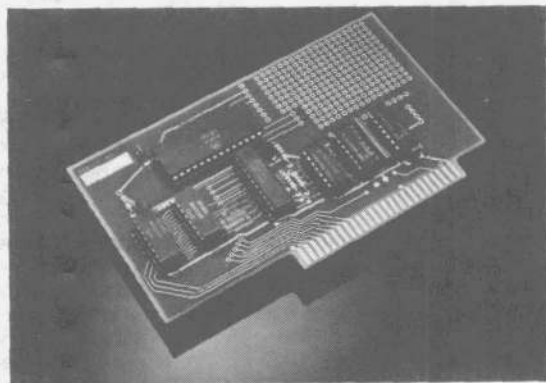
## LIGHT PEN FOR APPLE



Draw on the screen like pencil and paper. Resolves over 50,000 screen points. Ideal for hi-res and lo-res graphics. Menu selection ability frees user from the keyboard. Complete control of the computer or peripherals from the screen. Lets novice users operate programs immediately. Works with any monitor or T.V., color or B/W. Complete with 6 demo programs (including checkers) with full listings in 50 page manual.

**10002** ..... \$249.95

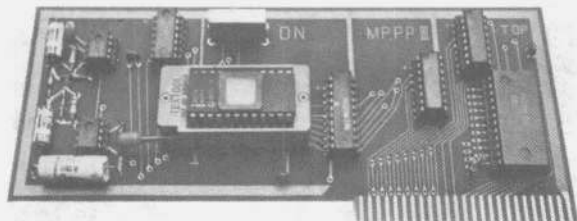
## PROGRAMMABLE TIMER MODULE



- Flexible external interface patch area for custom interface applications
- Selectable prescaler on timer 3 capable of 4MHz input
- Programmable interrupts
- Readable down counter indicates counts to go to time-out
- Selectable gating for frequency or pulse width comparison
- Three asynchronous external clock and gate/trigger inputs internally synchronized
- Three maskable outputs to patch area
- Power down ROM
- Supports interrupt daisy chain
- Allows DMA daisy chain
- 256 byte firmware (ROM) of software (RAM) space available

**7440A** ..... \$159.95

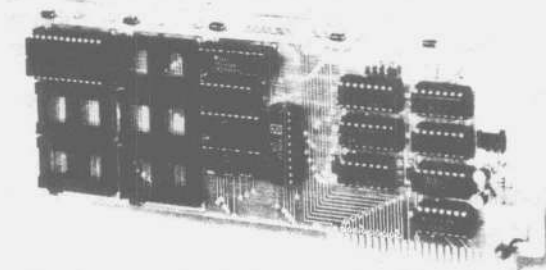
## EPROM PROGRAMMER



Fully assembled. • Completely self-contained • Textool Zero insertion force socket for EPROM • Onboard 25 volt power supply • Double sided plated through holes on fiberglass PC board • Gold plated edge connector • Fully socketed • Latest low-power Schottky IC's • Solder mask • Put memory in two empty ROM slots in APPLE II • Replace memory in existing APPLE II ROM slots • Add new operating systems to APPLE II • Programs INTEL 2716 2K byte EPROM's, 2758 1K byte EPROMs and other compatible 5 volt EPROMs • Put peripheral drivers in permanent memory • Use APPLE II to program EPROMs for other computers

1008Z ..... \$ 99.95  
2708 ADAPTER  
1009Z ..... \$ 14.95

## ROMPLUS+



**NEW EXPANDABILITY** ROMPLUS+ is a peripheral board whose added features can turn the Apple computer into the most powerful personal computer available today.

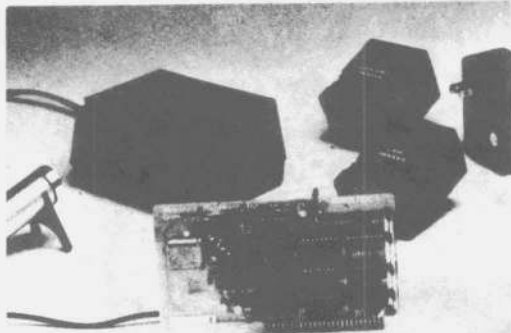
**NEW POWER.** ROMPLUS+ provides six sockets to accept individually addressable 2K ROM's or EPROM's. Keyboard Filter™, a 2K ROM program, comes installed on the ROMPLUS+ board and adds many useful features to your Apple, including: • Upper and lower case letters. The only system that offers keyboard input and standard shift key operation. • Multiple user-defined character sets. • Colored or inverse-colored letters. • Keyboard macro—two key-stroke, automatic typing of multiple, user-defined words or phrases. Including BASIC and DOS commands. • Mixed text and graphics. • Improved cursor control. • STOP LIST and END LIST. • Works with Integer BASIC, RAM or ROM Applesoft, and DOS • And more...quick to learn. Easy to use. • Software support provided on disk includes demonstration programs and two Editors that allow you to define your own characters or keyboard macros.

**(SOPHISTICATED FIRMWARE.)** In addition to the Keyboard Filter ROM, ROMPLUS+ offers five sockets for ROM or EPROM, plus "scratch-pad" RAM. And, sophisticated firmware on ROMPLUS+ allows one, two, or more of its chips to be used simultaneously for programs longer than 2K.

**EXPANDED UTILITY.** Many software programs really ought to be utilized as firmware. ROMPLUS+ makes that an actuality for the Apple by providing six additional ROM sockets.

MH19153 ..... \$169.95

## INTROL/X-10.



**COMPUTERIZE YOUR HOME.** The Introl/X-10 peripheral system for your Apple® Computer allows you to remotely control lights and electrical appliances in your home.

**YOU'RE ALREADY WIRED.** Introl/X-10 operates by utilizing your computer's intelligence to command the BSR System X-10 to send signals over regular 110 volt household wiring. That means you can control any electric device in your home without additional wiring.

**READY TO USE.** Introl/X-10 comes with complete software to control devices on pre-determined schedules, and features: • Control devices at a specific time • Select a daily or weekly schedule • Specify a day of the week, or an exact date for the particular event. • Specify an interval of time for an event. • Rate device wattages for a running account of power consumption during your schedule for energy management. • Used with your Apple Clock™ your schedules may run in "background" while other programs may run at the same time in "foreground".

**EVERYTHING YOU NEED.** The Introl Controller board plugs into a peripheral slot of your Apple. With an ultrasonic transducer it transmits control signals to the BSR/X-10 Command Console which may be plugged into any convenient AC outlet near your computer. On command, signals are sent to remote modules located at the devices you wish to control. Up to 16 remote module addresses may be controlled from your Apple.

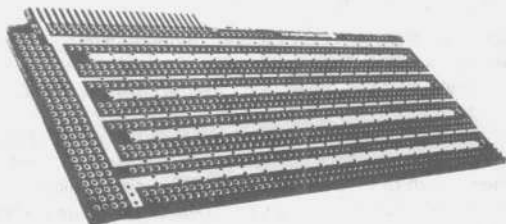
**AVAILABLE NOW.** The Introl/X-10 system consists of the Introl Controller board with timer and ultrasonic transducer, the X-10 Command Console and three remote modules.

X10A ..... \$279.95  
Complete and tested if you already have a BSR System X-10, the Introl Controller board is available separately.

X10B ..... \$189.95  
Additional remote modules are available

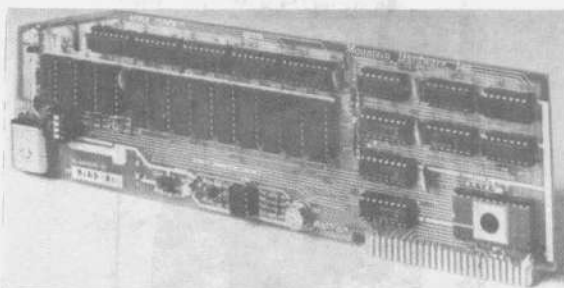
X10C ..... \$ 15.95

## HOBBY/PROTOTYPING CARD



7907 ..... \$ 14.95

## THE APPLE CLOCK



A real-time clock for your Apple II.\* The Apple Clock from Mountain Hardware. Time and date in 1mS increments. Real time interrupts allow you to pre-program events without derailing the system. Time events. Call up appointment lists. Call up monthly statements. Time and date transactions. You name it And, on-board battery backup keeps your clock up. . . even when the power goes down. Easy BASIC programming with routines carried in on-board ROM.

MHP-X003 ..... \$199.95

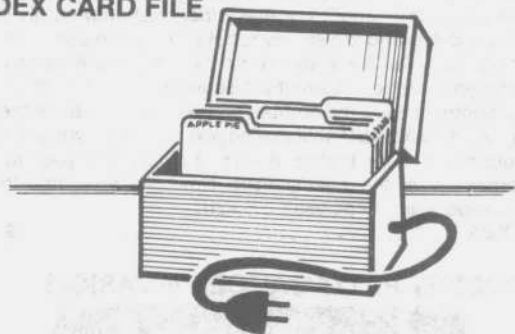
## APPLE II DISC



DRIVE ONLY	
A2M0003 .....	\$489.95
DRIVE AND CONTROLLER	
A2M0004 .....	\$529.95

# APPLE SOFTWARE

## THE ELECTRONIC INDEX CARD FILE



by Bob Bishop (S.T.)

A great program for storing phone numbers and addresses, recipes, cataloging a collection etc. Uses the **APPLE** disk, each card holds up to 12-40 character lines, and are stored in alphabetical order. Comes on tape to be transferred to disk.

APPLE II VERSION—16K-W/DISK  
A44114 ..... \$ 19.95

## APPLE-DIALER

by Bob Babcock

Now you can have your Apple II to automatically dial stored telephone numbers and to keep a record of all long distance calls made including the time and charges for instant recall. Apple-Dialer consists of 5 sub programs interactive with each other and requires Floating Point Basic and Disk.

A very simple interface from the Game I/O of Apple to the rotary dial contacts of the telephone is all that is needed to complete the package a diagram and parts list is provided for your convenience to build the interface.

BOBAB1 ..... \$ 69.95

## VISICALC

Born out of the observation that many people use pocket calculator in conjunction with pencil and paper.

When you balance your checkbook, you use a calculator to add up the figures, then you write down the results. Calculating sales projections, income taxes, budgets and many other tasks is done with calculator, pencil and paper.

**VisiCalc** is a personal problem solving aid. It combines the convenience and familiarity of a pocket calculator with the powerful memory and electronic screen capabilities of a personal computer.

With **VisiCalc**, the computer's screen becomes a "window" that looks upon a much larger "Electric Blackboard." This Electric Blackboard is divided into columns and rows. Its size is limited only by the amount of memory in your computer.

You can scroll the computer screen in four directions to look at any part of the Blackboard, or you can split the screen into two windows to see any two parts at the same time.

The intersecting lines of the columns and rows define literally thousands of entry positions. At each of these positions you can enter an alphabetic title, a number, or a formula.

39094 ..... \$139.95

## BUSINESS SOFTWARE

This package consists of accounts receivable, accounts payable, general ledger, inventory and payroll. It comes with a 130 page manual, a ROM CARD containing the search and sort routines and the programs on 8 diskettes. This system is the most oriented package we've seen to date, and is fully integrated. To use this package you will need an APPLE II with 48K of memory, APPLESOFT on ROM, 2 disk drives and a 132 column point of sale ticket printer.

### INDIVIDUAL MODULES

A5B114I .....	\$195.95
FULL BUSINESS PACKAGE FOR APPLE II	
A5B114 .....	\$795.95



## MATH TUTOR I



The **Math Tutor I** package is designed to help younger children learn the concepts of mathematics. It uses the technique of positive, immediate reinforcement. When the child enters a correct answer, he or she is rewarded with the opportunity to move a spaceship, cast a magic spell, or rescue a man from a most unfortunate fate. By using this method of positive reinforcement, children will learn to associate mathematics with pleasant experiences, as opposed to the stark reality of numbers that has driven so many pupils to an early dislike of math. The program also provides the opportunity for parents to indulge in a unique learning experience with their children, while introducing them to the exciting world of micro-computing. Teachers can also use the program in a classroom setting to provide that extra incentive. **Math Tutor I** contains the following programs: **Hanging** A variation of the traditional game of Hangman. In **Hanging**, your child can spare the graphic character's "life" by correctly answering the questions posed by the computer. **Spellbinder** The student is cast as a magician competing against another magician who's controlled by the computer. He must answer the questions about fractions correctly in order to cast magic clouds, fireballs, and other spells at his rival. **Whole Space** Students are given the opportunity to lead an attack on an evil planet. Every time a correct answer is given to a math problem posed by the computer, he can move his ship closer to his goal. Every wrong answer gives the enemy an opportunity to fire back. Note: The **Hanging** program requires Applesoft II BASIC. The **Whole Space** and **Spellbinder** programs can run in integer BASIC.

0073A ..... \$ 7.95

## TALKING CALCULATOR

by Bob Bishop (S.T.)

This program transforms your Apple II into a talking 10 digit calculator. This program uses Apple Talker subroutines (included) and will "say" the answer to math problems as well as print them on the screen.

APPLE II VERSION—16K

A2G119 ..... \$ 12.95

## APPLE II MAILING LIST PROGRAM

CASSETTE

A3B107 ..... \$ 19.95

## MATH TUTOR II



**Math Tutor II** is designed to complement the **Math Tutor I** package and introduces your student to more advanced mathematical principles. Again, it uses the technique of positive reinforcement by offering rewards for correct answers—a principle recognized effective in helping students develop healthy attitudes towards study. To keep pace with your pupil's development, all of the programs in this package may be used with any one of four levels of difficulty. Package includes: **Robot Duel** Each time your pupil correctly answers a question involving volumes of geometric solids, he's allowed one shot at the computer "robot". For every incorrect answer, his shield power drops and the enemy robot is given the opportunity to shoot back. **Car Jump** Make the car jump over the buses. Every time your student correctly calculates the areas of various geometric planes, the number of buses in the line is increased by one. **Sub Attack** Practice using percentages as you maneuver your sub into the harbor. A correct answer lets you fire your torpedoes at the enemy fleet. Note: All programs in this package require Applesoft II BASIC.

0098A ..... \$ 7.95

## ROCKET PILOT/SAUCER INVASION



by Bob Bishop (S.T.)

In **ROCKET PILOT**, fly your ship over a mountain to a safe landing on the other side. You have control over your ship's movement in four directions. In **SAUCE INVASION** you try to destroy attacking flying saucers with missiles. You control when they're fired and from where. Both games make use of the game paddles and sound.

APPLE II VERSION—16K

A2G124 ..... \$ 12.95

## STAR WARS/SPACE MAZE

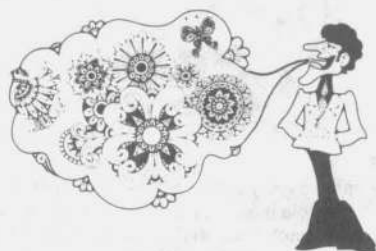
by Bob Bishop (S.T.)

**STAR WARS** is based on the movie. Try to destroy the attacking TIE SHIPS. In **SPACE MAZE** you try to move your ship through a maze without hitting the walls. Both of these games use the paddles and sound.

APPLE II VERSION—16K

A2G123 ..... \$ 12.95

**TIC-TAC-TALKER—SPECTRUM ANALYSIS**



This is a 24K program which allows you to play TIC-TAC-TOE verbally with your APPLE II. All you need is your tape recorder and a microphone. This program contains voice recognition and response software. On the other side there is a SPECTRUM ANALYSIS program which plots a graph of incoming sound.

APPLE II VERSION—24K  
**A3G120** ..... \$ 19.95

**SCREEN MACHINE**



**By Bill Depew**

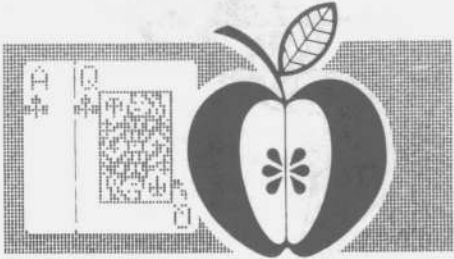
Open the manual and **LOAD** the cassette. Then get ready to explore the world of Programmable Characters with the **SCREEN MACHINE**. You can now create new character sets—foreign alphabets, electronics symbols and even Hi-res playing cards, or, use the standard upper and lower case **ASCII** character set. The **SCREEN MACHINE** lets you redefine any keyboard character. Just create any symbol using a few easy key strokes and the **SCREEN MACHINE** will assign that symbol to the key of your choice. For example: create a symbol, an upside-down "A" and assign it to the keyboard "A" key. Now every time you press the "A" key, or when the Apple prints an "A", the "A" will appear upside-down. Any shape can be assigned to any key!

**SCREEN MACHINE** gives you the option of saving your character symbols to disk or tape for later use. No complicated "patching" is needed. The **SCREEN MACHINE** is transparent to your programs. Just print the new character with a **BASIC** print statement. The **SCREEN MACHINE** is very easy to use.

Included on the cassettes are Apple Hi-res routines in **SOFTAPE'S** prefix format. You can use both Apple's routines and the **SCREEN MACHINE** to create the best graphics in microcomputing. Use **SCREEN MACHINE** with your **APPLE-SOFT** programs also. 24K memory required.

APPLE II PLUS APPLE II REGULAR  
**SMD1278** ..... \$ 9.95

**APPLE "21"**



**By Bill Depew**

Here is a true Las Vegas Blackjack game with Hi-res playing cards. One, two, or three players can challenge the "Dealer" to win on the table. This game keeps track of all your winnings and losses and gives you a balance when you leave the table. This game is constructed for ease of operation. Any player can quit or join at any time without disturbing the game!

You can choose the table limit and maximum for your table. You can also change tables at any time. Don't worry, the house will "loan" you money when you're out.

This Hi-res program was created using the screen machine to define the cards. Requires 24K.

APPLE II REGULAR  
**BJD378** ..... \$ 9.95

**CRAZY 8s**



**By Bill Smith**

Tired of Solitaire? Then play **CRAZY EIGHTS** with a worthy opponent. The Apple plays with its cards face up or hidden—your choice. And, if you'd like, the Apple will help you choose playable cards. Great for adults and easy enough for children. **CRAZY EIGHTS** means hours of fun! (24K)

APPLE II REGULAR  
**CES579** ..... \$ 9.95

**CRAPS**

**By Roger Walker**

Play Las Vegas Craps on a high resolution playing table created by your APPLE. Place bets, play the field, passline and hardway rolls...all are possible with this detailed simulation. Dice rolls are animated on the screen. Improve your game or devise your own "system". Craps requires **INTEGER BASIC** and 24K or memory. **BONUS!!** Included on the back side of the tape is **Bright Pen™ Craps** for those lucky guys with the **SOFTAPE Light Pen**. You will be amazed how easily moves are made and how fast the game progresses!!

APPLE II REGULAR  
**ACW479** ..... \$ 14.95

**BOMBER!**



by Bob Bishop (S.T.)

You are the bombardier and your assignment is to drop a bomb on the moving target below! You must allow for the speed of your plane and the force of gravity.

APPLE II VERSION—16K

A2G121 ..... \$ 9.95

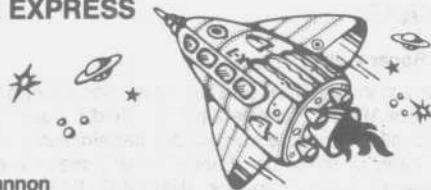
**FORTH II**

FORTH is a fully recursive, stack-oriented language originally developed in the late 1960's at the National Radio Astronomy Observatory. It has been used on mini-computers for the accurate control of very large telescopes. FORTH still possesses a very large following after the passage of almost a decade and a half! This popularity persists due to several strong points for the language; 1. It is inherently structured. There are no GOTO statements in FORTH, nor is there any possibility of poor nesting of language constructions. 2. FORTH provides a true, high-level language capability for small computers with very little overhead. 3. FORTH is FAST! A compiling language, FORTH is many times faster with execution speeds ten times that of BASIC! 4. FORTH provides a language structure which allows rapid debugging of smaller code sections. The program development process proceeds with the construction of larger segments built from the smaller ones. At each stage, rapid and simple procedures are available to test the code. In certain operations, FORTH code can call on itself! 5. FORTH is a relatively simple language to implement. This is especially true for micro-computers such as the Apple.

FORTH II has been designed to take full advantage of the Apples' unique characteristics. FORTH II comes in its own 3-ring binder with 90 pages of documentation explaining its use. FORTH II comes on an Apple Diskette and includes 2 demonstration programs and a library of useful routines. Also included is a registration card which allows you to receive future supplements to the FORTH II Reference Manual. FORTH II requires at least 24K of memory and an Apple Disk II Drive.

FOG279 ..... \$ 49.95

**JUPITER EXPRESS**



By Gary Shannon

Command your ship through the hazards of the Asteroid belt between Mars and Jupiter. Select your own degree of difficulty. The graphics used in this game make it unique to all similar games on the market. (16K).

REGULAR

JES179 ..... \$ 9.95

**PRO GOLF**



By Jim Wells

Now, even on rainy days, you can improve your game with PRO GOLF. With the Apple II as your caddy, you choose your own clubs and irons on each shot on this full 18-hole course. Every fairway has its own challenging sandtraps and water hazards, but distractions disappear when the screen displays only the green as you begin to putt. Your Apple-caddy keeps track of your score. Have fun, and remember...keep your eye on the ball!

REGULAR

PGW379 ..... \$ 12.95

**MICROGAMMON 1.0**

By Steve Baker

Pit your mental skill and luck against that of the Apple with this computer implemented version of the popular board game Backgammon. All the moves are displayed on the video screen along with the board layout and pieces.

This program requires at least 16K of memory to run from cassette and 32K of memory to be stored and played from an Apple II Disk System. No additional hardware is needed.

Learn, practice, and enhance your Backgammon ability a true competitor. (To our knowledge, the Apple doesn't cheat!!)

REGULAR

MGB279 ..... \$ 14.95

**MONSTER MAZE**



By Gary Shannon

MONSTER MAZE—Guaranteed the most complicated maze ever created. The poster was created by the Apple computer in 5 minutes! There is only one-way through. Maybe you'll find it too. 23" x 35".

APPLE II REGULAR

MMS479 ..... \$ 2.95

**STRATEGY GAMES-1 (C.C.S.) (CS-4003)**

Play CHECKERS\* in color against the Apple. SKUNK is a dice game for one or two players. UFO is a space game in which you must outwit an enemy spaceship. BLOCKADE with exciting graphics and sound effects, with a one or two player option. GENIUS, a challenging trivia quiz. \*Requires Applesoft BASIC.

APPLE II VERSION—16K

A2G141 ..... \$ 7.95

APPLE TALKER



FORTE



By Bob Bishop

By Gary Shannon

Give your Apple II computer the power of speech! Your programs can now talk to you with spoken words! Any Apple with 16K of memory or more can use this program. The **APPLETALKER**, which accepts voice or audio information through the cassette input port, digitizes the information and stores it in numbered tables in your computer's memory (RAM). The stored information may then be played back using the Apple's on board speaker. You can also **SAVE** the tables to tape for later use. Audio tables or "Talker Tables" are created using your cassette recorder and microphone.

**FORTE** is an interpretive language devoted to the playing of music. This language allows the operator the use of the music playing capabilities of the **APPLE II** computer in a way that, up until now, required hours of tedious calculations and coding to play only a few notes. With **FORTE** all of the hard work has been done for you.

By using the **APPLETALKER** subroutine package (written in assembly language) and a few lines of **BASIC**, you can use the "Talker Tables" you create to give any Apple program the power of speech without hardware costs!

The programs written in **FORTE** are as easy to enter, list and edit as programs written in **APPLE's** integer **BASIC**. Debugging a program is even easier. If the operator is familiar with the procedures used to write a **BASIC** program on the **APPLE**, using **FORTE** will be a breeze!

**APPLETALKER** comes complete with all the routines and instructions you will need. A **DEMO** program is also supplied. **SAVE** your **APPLETALKER** to your Apple diskette. (16K)  
**APPLE II REGULAR**

**FORTE** can play music from either one of two operator specified outputs. By using the appropriate command, the operator can play music from the speaker built into the computer, or from the cassette output for recording on to a high fidelity music system plugged into the output port.

**ATB778** ..... \$ 15.95

Programs written in **FORTE** are easily saved to disk or cassette and can be listed to a printer.

**FORTE** was developed to be easy and fun for the beginner, yet capable of handling the most complex passages the veteran musician can devise.

**FORTE** will run on any **APPLE** with 16K of memory and is the most powerful music language yet.

**REGULAR**  
**FES279** ..... \$ 19.95

APPLE-LIS'NER



MUSIC  
 KALEIDOSCOPE



By Bob Bishop

By Bob Bishop

**APPLE-LIS'NER**—An Apple II Software program which allows you to communicate with the Apple II computer via spoken words requiring no additional hardware. By using your cassette recorder and a microphone, **APPLE-LIS'NER** will listen for the words or phrases it has learned and respond under program control.

The package is easy to use and comes complete with a "PREFIX" program and all documentation needed to make your own programs with voice recognition.

**APPLE-LIS'NER** occupies less than 1K memory for a 31-word vocabulary. It is also compatible with **APPLE-TALKER** for real Conversational Software. **SAVE** your **APPLE-LIS'NER** on your Apple diskette.

**APPLE II REGULAR**  
**ALB978** ..... \$ 15.95

Create a fascinating color light show using your **APPLE II** computer. Using any audio input to the cassette port, this program will display many colored patterns for your enjoyment. Each pattern is unique to each input!

Written in machine language for speed, you can use input from your stereo to produce a demonstration unlike any other. Use it at your next party and show your friends the abilities of your computer. **MUSIC KALEIDOSCOPE** is easy to use and self documenting.

**REGULAR**  
**COB878** ..... \$ 9.95



## GOLF

Without leaving the comfort of your chair, you can enjoy a computerized 18 holes of golf with as complete choice of clubs and shooting angles. You need never cancel this game because of rain. One or two players can enjoy this game on the Apple with Applesoft II and 20K.

0018A ..... \$ 7.95

## CAI PROGRAMS-1

**US MAP** asks you to identify states and their capitals. **SPELLING** helps the user study a list of words he has previously entered. **MATH DRILL** for simple arithmetic problems. **ADD-WITH-CARRY** is a sophisticated toll for teaching addition of two and three place numbers by helping the student work the problem digit by digit, adjust to the student's level of skill.

APPLE II VERSION—16K

A2E104 ..... \$ 7.95

## SPACE GAMES-1

Four color-graphics programs for your Apple, including **ROCKET PILOT** an advanced lunar lander simulation in which you guide your spacecraft over the mountain to a safe landing on the opposite side. In **SAUCER INVASION**, you protect the earth by shooting down the alien invasion fleet with your missile launcher. In **STAR WARS**, you line up the Tie fighters in your sights and fire before they get away. **DYNAMIC BOUNCER** is a color-graphics demonstration program for your Apple which fills the screen with colored walls that appear and disappear at random, while a ball bounces around within.

APPLE II VERSION—16K

A2G140 ..... \$ 7.95

## SPORTS GAMES-1

Four exciting graphics games. Includes an amazing **BASEBALL** game for two players who control infielders and outfielders, type of pitch, and the swing of the bat. Even has sacrifices, double plays, and home runs. **HORSE RACE** allows up to eleven players to bet on the outcome of a horse race. **SLALOM** challenges you to ski through the gates in a minimum time. In **DARTS** you try to throw your darts as close to the bullseye as possible by controlling the game paddles.

APPLE II VERSION—16K

A2G141 ..... \$ 7.95



**BOWLING/TRILOGY** Enjoy two of America's favorite games transformed into programs for your Apple: •**Bowling**—Up to four players can bowl while the Apple sets up the pins and keeps score. Requires Applesoft II. •**Trilogy**—This program can be anything from a simple game of tic-tac-toe to an exercise in deductive logic. For one player. This fun-filled package requires an Apple with 20K.

0040A ..... \$ 7.95

## SOFTALK

The official newsletter of the **SOFTAPE** Software Exchange. Its goal—to supply Apple owners with the proper procedures to aid their programming efforts. **SOFTALK** provides advanced and novice programmers a forum for dialog, questions and answers, and discoveries.

SUBSCRIPTION PRICE

STPUB ..... \$ 4.95

## WHATSIT

**WHATSIT**, an acronym for the words, "Wow! How'd All That Stuff Get In There?" is an effective data base/query system for micro computer users. Used as a data base "manager," **WHATSIT** can support a disc-resident data base and process queries (as well as updates) in the real-time conversational mode.

Using simple pidgin English "requests," you can store, index and retrieve information about one or more aspects of related or unrelated subjects. Information is stored under your designated "Subject" and "Tag" headings, which (along with the data) can be added to, changed or deleted at any time.

**Additional Features:** Due in part to the versatility and nature of the Apple computer system, **WHATSIT** for Apple has additional features not found in the Northstar or CP/M\* versions. Apple **WHATSIT**'s "self-prompting" feature is activated by a simple **WHATSNEXT?** command, and you can store information as easily as answering a question. Apple **WHATSIT** features the Soundex algorithm, which allows easier cross indexing of similar sounding subjects, and some of Apple **WHATSIT**'s questions blink on the screen to remind you that **WHATSIT** is waiting for information.

APPLE INTEGER BASIC 32K MEMORY REQUIRED  
STANDARD,

WAIW32 ..... \$100.95

OPTIONAL 48K MEMORY REQUIRED

WAIW48 ..... \$125.95

## INSTANT LIBRARY

Start your Apple library with 8 tapes of programs that utilize the special abilities of the Apple II Computer.

Load any one of the Modules into your computer and a menu appear on the screen automatically. Select a program and the computer will execute it instantly!

Included in the price of the **INSTANT LIBRARY** is a membership in the **SOFTAPE** Software Exchange, one of the largest clubs in the country!

Your first 8 tapes contain the following programs:

**ADVANCED DRAGON MAZE**—Improved version with a real time dragon. **DIGITAL DERBY**—Animated horse race lo-res, with music. **SAUCER WAR**—Two player game; saucers shoot phasers. **3-D PLOT**—Hi-res plot of seven equations. **ETCH-A-SKETCH**—Use the paddles to draw Hi-res shapes. **STAR**—Hi-res color demo of a star burst. **OTHELLO**—GR board game and you can watch the computer think. **MASTERMIND**—Challenge your ability to think ahead. **SEVENS**—Card game. Like crazy 8 and computer plays 1-7 hands. **APPLEODION**—A comprehensive music interpreter with 5 octaves and 12 voices, write your own. COMES WITH TWO SETS OF MUSIC. **AWARI**—Ancient game of logic and skill in graphics. **TOWERS OF HANOI**—Challenge your logic with this graphic game. **HEX PAWN**—Pawn chess game and the computer learns to beat you! **BLACKJACK**—Play '21' and test your skill at this table. Split or double down! This is the best game in town! **HYPER-LIFE**—Fast Lo-res population study. 3 gen/sec. **8 GRAPHIC DEMOS**—8 graphic programs to show Apple's colors. **PROJECT UFO**—Shoot down the UFOs and save the earth. **CLEAN SWEEP**—Pong type game. Try and clean the screen. **STARWARS**—Lores game of skill and agility. **LUNAR LANDER**—Land your ship on the moon.

**8AMC** ..... \$ 39.95

## SUPER-TEXT™

**SUPER-TEXT** is a character oriented editor with complete cursor controls to easily move the cursor to any position in the text with a minimum of keystrokes. Built in floating point math and automatic tabbing facilitate the preparation of all manual reports including financial reports, insurance forms, real estate settlements and more.

**MUSTEZ** ..... \$ 94.95

**MICRO INFORMATION SYSTEM™** (48K) is a breakthrough in effective information systems of any size. This one system effective information systems of any size. This one system handles accounts payable/receivable, inventories, appointment calendars, cost estimating, real estate listings, sales solicitation, manpower accounting, selective mailings and label printing, delay information, phone directories and more! On diskette

**MUM 152** ..... \$ 98.95

**THREE MILE ISLAND™** (48K) Is the technology of the nuclear reactor too complex to handle? Now you have the opportunity to decide for yourself with **THREE MILE ISLAND**, a realistic simulation of a pressurized nuclear reactor. Four spectacular displays monitor the containment building, turbines, filters, condenser reactor core and the pump house. Valves, pumps, turbines, filters and control rods are individually activated by keyboard command. The comprehensive documentation describes in detail the operating mechanisms and component interactions. On diskette.

**MUTM12** ..... \$ 37.95

**APPILOT EDU-DISK™** (32K) A complete multi-program C A I system for the APPLE II includes program editor and APPILOT interpreter on diskette with extensive on line HELP lessons plus documentation manual.

**MUAED2** ..... \$ 48.95

## SUPER-LOAD® CASSETTES

**APPEN-I TEXT EDITOR**, a real text editor for cassette based APPLE-II computers. Insert, delete or change lines of text in the computer's memory. A 'FIND' command will locate all occurrences of a specified text string. Save your text on tape and recall it later or merge it with another file. 1001 uses in the home—menus, birthdates, addresses and phone numbers, appointments, etc. Easily links to your printer. Complete with easy-to-understand user's guide (8K).

**MUATEZ** ..... \$ 17.95

**MAZE GAME**, the original and still the best maze game for APPLE II users. Set the size and difficulty level of your maze and watch as it is randomly generated. Every maze is different. Special graphics place you inside a colorful 3-D maze. Player options include getting a maze map, having a compass available, and leaving retracable footprints on the maze floor. Our most popular game and a challenge for the solitary player of all ages. (16K).

**MUMG2** ..... \$ 14.95

**U-DRAW-II DISK**—Automatically builds and edits multi-figure shape tables that are directly transferable to your BASIC programs. U-DRAW-II also includes an elementary animation language for programmed manipulation of your figures. You won't find better graphics capabilities at 100 times the price! (32K)

**MUUP2D** ..... \$ 37.95

**U-DRAW** is a high resolution programmable graphics editor with tape I/O for storage of finished drawings. It's uses range from architectural type drawings and interior design to computer art and animation. You can create a figure and rotate, expand, contract or move it anywhere on the video screen with a few simple keystrokes. Includes documentation manual. (16K).

**MUUP1** ..... \$ 16.95

**ELECTRIC CRAYON** utilizes the 15 brilliant colors of low resolution graphics to turn your Apple into a radiant color display, resembling a moving neon sign. Easily draw and animate color figures directly from the keyboard. Your drawings can be saved on tape and recalled later. Includes documentation (8K).

**MUEC2** ..... \$ 17.95

**THE MUSIC BOX**—Your APPLE comes alive with sound and color. Play it as a three octave instrument or type in a song and the music box will play it for you! A brilliant full color light show accompanies the music. Standard musical notation includes sharps and flats, note time, rests, dotted notes and tempo. All notes can be easily retuned from the keyboard to produce special sound effects. Comes with two songs and documentation that explains basic musical notation. (8K).

**MUMB2** ..... \$ 11.95

**TANK WAR** is a state-of-the-art shootout for two players with dramatic sound and graphics. Players chose the style and size of their tank. Steer your tank with the game paddles to pursue and out maneuver your opponent. Fire two types of missiles to disable and destroy the enemy. Damage speed and chosen tank size all interact for maximum interest. (16K).

**MUTW2** ..... \$ 12.95

**ESCAPE**, is an exciting 3-D adventure with special color graphics that place you inside a maze of hallways. Find your way out by following the clues of people you meet inside. But be careful...the Wars will not hesitate to give you false maps and compasses. It's hard to quit this game! Rated as the number 1 Apple program by the Marin Computer Center. (16K).

**MUEEZ** ..... \$ 12.95

## SUPER-LOAD® CASSETTES CONT.

**GLOBAL WAR** is an adult strategy game for two to nine players and features a highly detailed projective map of the earth's continents divided into forty regions.

**MUGW2** ..... \$ 16.95

**BASEBALL**—brings the excitement of Major League baseball to your APPLE II. Baseball is a high resolution action game with outstanding player control. Strikes and outs are tallied and a scoreboard is displayed after every batter. So get up to bat, watch out for those slow pitches, hit the ball and hope the the opposing team does not catch it. A challenging game and a must for sports fans. Requires APPLESOFT board and 16K.

**MU BB2** ..... \$ 13.95

**UNCLE SAM'S JIGSAW** is an educational geography game featuring a detailed drawing of the United States. Each of the 48 continental United States must be recognized by its shape and location in a high resolution map of the U.S.

**MUUSJ2** ..... \$ 11.95

**DR. MEMORY**, Disk Word Processor allows the user to insert, delete, change, find, merge and block move text. DR. MEMORY controls left and right margins, inter-line spacing, end-of-page eject, automatic paragraphing, right margin justification, and paragraph indentation. With DR. MEMORY, you can also print upper and lower case characters without the need for any additional hardware. This is a highly efficient assembly language program that occupies less than 4K and can be operated at normal typing speeds. DR. MEMORY includes a separate documentation manual plus on-line "Help" reference 32K.

**MUPM2** ..... \$ 47.95

## KNOW YOURSELF

**LIFE EXPECTANCY**—will a different life style increase your life expectancy? **PSYCHOTHERAPY**—analyze symptoms in your feelings and behavior to determine your mental health.

**COMPUTER LITERACY**—what's yours? **ALCOHOL**—effect of alcohol on your behavior.

APPLE II VERSION —16K

**A2H107** ..... \$ 7.95

# ATARI

## ATARI 400™



**ATAR12142** ..... \$449.95

## ATARI 810™ DISK DRIVE

- Uses standard 5 1/4 inch diskettes • 92K bytes storage on each side of diskette • Up to 4 disks can operate with a system • Disk busy indicator • Automatic standby (built-in microprocessor) • Crystal controlled for accuracy • Average data access time/236 milliseconds • Each disk drive is individually accessible • Average data transfer rate 6,000 bits per second

**ATAA 32143** ..... \$589.95

## ATARI 410™ PROGRAM RECORDER

**Accessories:** Program Recorder—300/600 Baud with custom designed electronics for high reliability, automatic motor, volume, and tone control, and dual audio/digital information tracks.

**ATA 32145** ..... \$ 89.95

## ATARI 800™



**Console** (Processor and Memory) • High Resolution Color Graphics. • 57 full stroke keys, 4 separate function keys. • Built-in RF Modulator (for use with standard television). • Composite video output (for use with high resolution monitor). • Power indicator/low voltage light. • 4 controller ports. • Power on/off switch. • Channel 2-3 selector. • Internal speaker (in addition to audio channel through television). • Two easily accessible cartridge slots for rapid program insertion. • Three internal cartridge slots for expandable memory cartridges. • Custom designed video display microcontroller chip for superior color graphics capability. • High Speed serial input/output port for connection to all peripheral devices. • 6502 Microprocessor.

**ATARI 2141** ..... \$799.95

## ATARI 820™ PRINTER

- High resolution, dot matrix, impact printer • Standard roll paper and ribbon • UL Approved • 40 characters per line, one line per second • Power switch and indicator light • Paper advance button • Built-in microprocessor (smart printer) • Crystal controlled for data accuracy

**ATAA 32144** ..... \$499.95

## A TO D D TO A CONVERTER

Analog to Digital and Digital to Analog Converter Board. Features low cost medium speed (50,000 conversions per second) for applications such as speech recording and music synthesizing. Single power (+5) required. Parallel inputs and outputs include 8 data bits, strobe lines, and latches. Analog inputs and outputs are medium impedance zero to five volt range.

KIT	
79287K .....	\$49.95
ASSEMBLED	
79287A .....	\$69.95

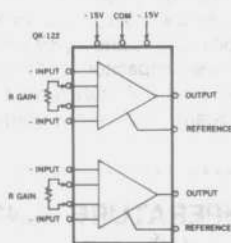
## PEAK-SENSE AND HOLD SAMPLE AND HOLD

**FEATURES** 1 microsecond peak-sense acquisition. 30 millivolts/second memory droop rate. Peak-sense digital alert output. 8 bit equivalent accuracy. QK112 consists of two different types of analog memory. A peak-sense and hold circuit produces a DC output voltage equal to the peak positive input. The output remains unchanged until the circuit is reset or a larger input is applied. An input gate can be used to isolate memory from larger inputs. A status output indicates when a peak has occurred.

The sample and hold circuit acts as a unity gain amplifier until commanded to hold the signal level at the moment a command is received.

KIT	
QK112 .....	\$ 28.95

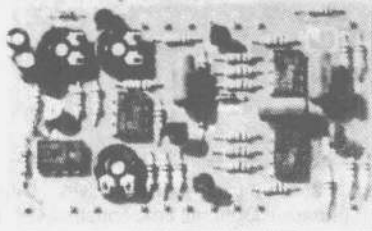
## DUAL DIFFERENTIAL INSTRUMENTATION AMPLIFIER



Computer-controlled switched-gain amplifier. High-gain pre-amplifier for A-to-D conversion. Rejects hum and noise on low-level signal lines. Extracts small signals super-imposed on DC voltages. Convenient differential transducer amplifiers. QK122 is a dual instrumentation amplifier with identical sections. Each amplifier has differential input and single-ended output. Gain is set with a single resistor for each section.

KIT	
QK122 .....	\$ 24.95

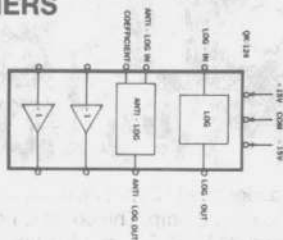
## TRIPLE A-D CONVERTER



**FEATURES** 1.0 volt to 200 volt full scale input. 200 microsecond to 5 millisecond conversion time. 8, 10 or 12 Bit system compatibility Pulse-width technique. **GENERAL DESCRIPTION** QK100 is a triple section, pulse-width type analog-to-digital converter. Integration of the input voltage rejects hum, noise and any rapid fluctuation. A common voltage reference supplies the separate sections.

KIT	
QK100 .....	\$ 36.95

## LOGARITHMIC AND ANTI-LOGARITHMIC AMPLIFIERS



**FEATURES** Adjustable scale factors and offsets. Greater than 1000:1 (60 dB) Dynamic range. Error is less than 0.2%. Various exponential and rooting functions. QK124 has two separate sections to provide both the logarithmic and anti-logarithmic functions. Each section shares a common reference current source. Two uncommitted inverting amplifiers allow negative signals to be converted. A simple resistor network produces various rooting or exponential functions.

KIT	
QK124 .....	\$ 40.95

## 100 WATT AUDIO AMP

Direct coupled output • Flat response 20 to 20 KHz • THD .05% • Peak output 7A • Short circuit proof output • Input impedance 10K • Output impedance 4 to 6 ohms • Requires + & -37.5 VDC, 2A, standard line level (1 volt), and heat sink.

KIT USES RCA HC2000H	
100WA .....	\$ 95.95
BOARD ONLY	
100W .....	\$ 9.95

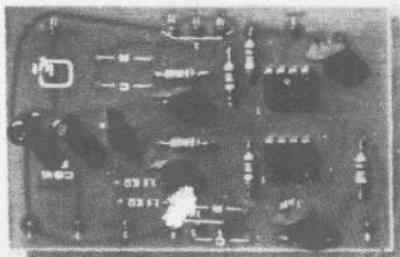
## NEW PRODUCTS

DUAL WATER LEVEL SENSORS	
QK106 .....	\$ 34.95
DUAL SURFACE TEMPERATURE SENSORS	
QK108 .....	\$ 30.95
DUAL HALL-EFFECT DC MAGNETIC SENSORS	
QK109 .....	\$ 54.95
MULTIPLE AUDIBLE ALARM	
QK133 .....	\$ 25.95

MULTIPLE ANALOG COMPARATORS	
QK134 .....	\$ 39.95
DUAL "PEOPLE" SENSORS	
QK138 .....	\$ 34.95
DUAL GROUND MOISTURE SENSORS	
QK102 .....	\$ 29.95
DUAL LIQUID TEMPERATURE SENSORS	
QK104 .....	\$ 32.95
8/16 INPUT ANALOG MULTIPLEXER	
QK115 .....	\$ 38.95



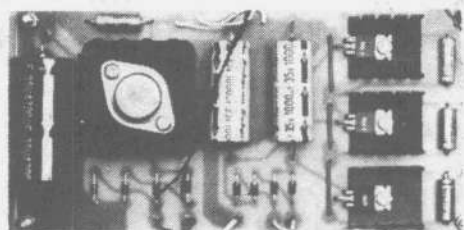
**DUAL LED PHOTO DETECTOR**



40 nanowatts/square centimeter/volt sensitivity. 60 millicandles LED luminous intensity. Optional time constant eliminates fast changes. Regulated LED intensity. QK105 is a dual photo-transistor and amplifier combination with two series connected LEDs as an optional light source. The two photo-detector/amplifier circuits are identical. A circuit option provides a light level difference output. KIT

**QK105** ..... \$ 27.95

**DC POWER SUPPLY**



This board supplies a regulated +5 volts up to 3 amps, +12 volts, -12 volts, and -5 volts up to 1 amp. The board is powered with 8 VAC at 3 amps., and 24 VAC C.T. at 1.5 amps. For this we recommend Stancore P-8380 and P-8667 respectively.

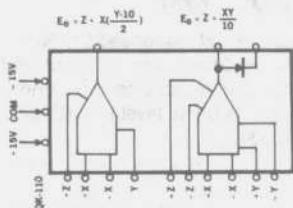
BOARD ONLY

**6085** ..... \$ 12.95

W/PARTS EXCLUDING TRANSFORMER

**6085A** ..... \$ 42.95

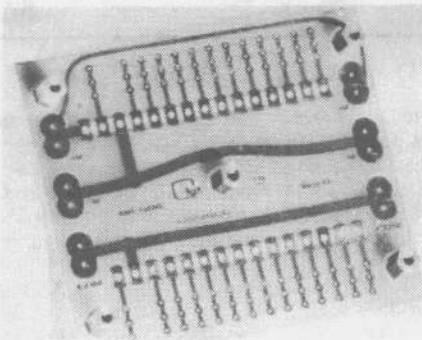
**VOLTAGE-CONTROLLED AMPLIFIER FOUR-QUADRANT ANALOG MULTIPLIER**



Computer-controlled scaling amplifier. Linearizing square-law transducers. Square root A-to-D conversion doubles dynamic range. Math functions without a microcomputer. Ratio of two voltages. QK110 has two separate sections, both using variable transconductance method of analog multiplication. A 2-quadrant multiplier produces a voltage-controlled gain amplifier. A 4-quadrant multiplier generates the square, square-root, divide and multiplication functions.

KIT  
**QK110** ..... \$ 43.95

**MOUNTING BOARD AND SOCKET**

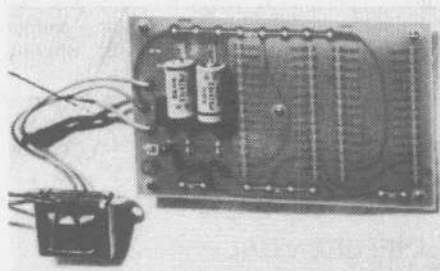


**APPLICATIONS** • Convenient functional kit socket • convenient means of mounting a kit.

**SPECIFICATIONS**—BOARD SIZE...4 inches by 3.3 inches (10.16 cm by 8.38 cm).

KIT  
**QK900** ..... \$ 8.95

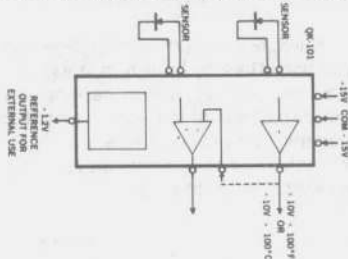
**POWER SUPPLY AND DUAL SOCKET**



±15 Volt output at 100 milliamps 105-125 volts AC input. QK103 consists of a circuit board, two socket patterns for mounting two functional Q-kits and a power supply circuit. A full wave rectifier, filter capacitor and integrated circuit regulators are on the board. A transformer is supplied for mounting off the board; mounting hardware is supplied.

KIT  
**QK103** ..... \$ 29.95

**DUAL AIR TEMPERATURE SENSORS**



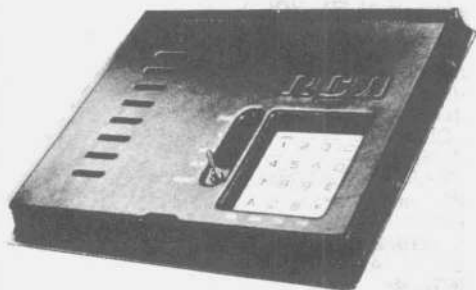
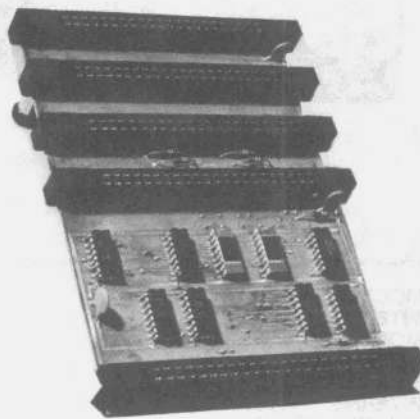
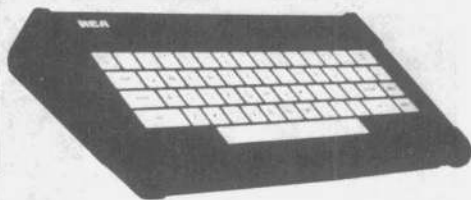
Fahrenheit or Celsius output. Remote sensing up to several hundred feet. Optional temperature difference output. Fast response silicon sensors. QK101 is a dual section circuit with a common regulated current source and voltage reference section.

Silicon junctions are used to sense temperature, assuring accuracy at low cost. The kit provides components for change to Fahrenheit to Celsius output, but Kelvin can also be obtained.

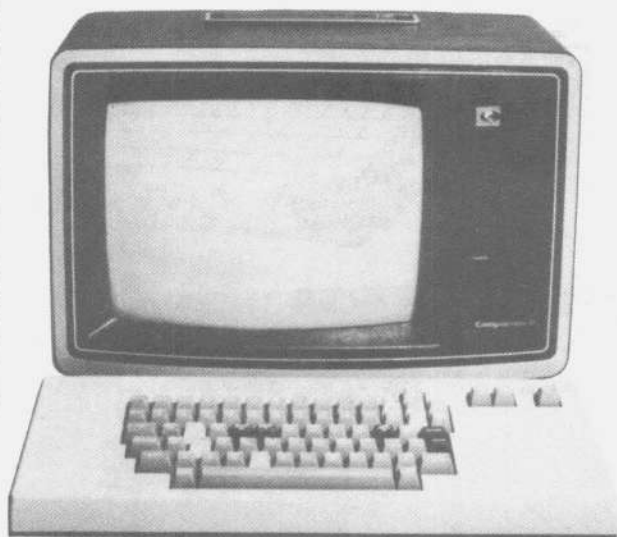
**QK101** ..... \$ 26.95

# COSMAC VIP

P.N.	Description	Optional User Price
VP-711 (CDP18S711)	<b>VIP - Video Interface Processor</b> An assembled microcomputer. Built-in cassette interface, video interface, 16-key keypad, 2K RAM, ROM operating system, CHIP-8 language and power supply. Output drives video monitor or rf modulator.	\$249.95
VP-44 VP-45	<b>RAM On-Board Expansion Kits</b> Four type 2114 (VP-44) or type 9131 (VP-45) RAM IC's for expanding the VIP on-board memory to 4K bytes. (Early kits used 9131 IC's - All others use 2114 IC's).	\$ 36.95
VP-590	<b>VIP Color Board</b> Displays VIP output in color! Program control of four background colors and eight foreground colors. CHIP-8X language adds color commands. Includes two sockets for VP-580 Expansion Keyboards.	\$ 69.95
VP-595	<b>VIP Simple Sound Board</b> Provides 256 different frequencies in place of VIP single-tone output. Ideal for use with VP-590 Color Board for simultaneous color and sound. Great for simple music or sound effects! Includes speaker.	\$ 24.95
VP-550	<b>VIP Super Sound Board</b> Turn your VIP into a music synthesizer! Provides two independent sound channels. Frequency, duration and amplitude envelope (voice) of each channel under program control. On-board tempo control. Provision for multi-track recording or slaving VIP's. Output drives audio preamp. Does not permit simultaneous video display.	\$ 49.95
VP-570	<b>VIP Memory Expansion Board</b> Plug-in 4K static RAM memory. Jumper locates RAM in any 4K block in first 32K of VIP memory space.	\$ 95.95
VP-580	<b>VIP Expansion Keyboard</b> Adds two-player interactive game capability. 16-key keypad with cable connects to sockets provided on VP-590 Color Board or VP-585 Keyboard Interface Board.	\$ 15.95
VP-585	<b>VIP Keyboard Interface Board</b> Interfaces two VP-580 Expansion Keyboards directly to the VIP. Not required when VP-590 Color Board is used.	\$ 10.95
VP-560	<b>VIP EPROM Board</b> Interfaces two Intel 2716 EPROMs to VIP. Place EPROMs anywhere in VIP memory space. Can also re-allocate on-board RAM in memory space.	\$ 34.95
VP-565	<b>VIP EPROM Programmer Board</b> Programs Intel 2716 EPROMs with VIP. Complete with software to program, copy, and verify. On-board generation of all programming voltages.	\$ 99.95
VP-575	<b>VIP Expansion Board</b> Plug-in board with 4 buffered and one unbuffered socket. Permits use of up to 5 Accessory Boards in VIP Expansion Socket.	\$ 59.95
VP-576	<b>VIP Two-Board Expander</b> Plug-in board for VIP I/O or Expansion Socket permits use of two Accessory Boards in either location.	\$ 20.95
VP-600	<b>ASCII Keyboard - Available 6/79</b> Fully encoded, 128 character ASCII alphanumeric keyboard. 58 light touch keys (2 user defined). Selectable. "Upper-Case-Only".	\$ 49.95
VP-610	<b>ASCII/Numeric Keyboard - Available 6/79</b> ASCII Keyboard identical to VP-600 plus 16 key numeric entry keyboard for easier entry of numbers.	\$ 65.95
VP-620	<b>Cable for ASCII Keyboards</b> Flat ribbon cable, 24" length, for connecting VP-600, VP-610 and VP-711.	\$ 20.95
TC1210	<b>9" Video Monitor</b> Ideal, low-cost monochrome monitor for displaying the video output from your VIP or other computers.	\$195.95
TC1212	<b>12" Video Monitor</b> A large (74 sq. in. picture) monochrome monitor for use with your VIP or other computers with video output.	\$325.95
TC1217	<b>17" Video Monitor</b> A really BIG monochrome monitor for use with your VIP or other computers with video output. 148 sq. in. pictures.	\$435.95
CDP18S731 CDP18S745	<b>RAM/I/O Expansion Kits for Older 18S022 Kits</b> Four type 9131 (18S731) or 2114 (18S745) RAM IC's plus other components for I/O expansion ports.	\$ 69.95
VP-700	<b>VIP Tiny BASIC ROM Board</b> Run Tiny BASIC on your VIP! All BASIC code stored in ROM. Requires separate ASCII keyboard.	\$ 39.95
VP-710	<b>VIP Game Manual</b> More exciting games for your VIP! Includes Blackjack, Biorythm, Pinball, Bowling and 10 others.	\$ 10.95
VIP-311	<b>VIP Instruction Manual (Included with VP-711)</b>	\$ 5.95
VIP-320	<b>VIP User Guide Manual (Included with VP-711)</b>	\$ 5.95
MPM-210B	<b>CDP1802 User Manual</b>	\$ 5.95



# COMPUCOLOR II



MOD3 8K	
<b>INTERM3</b>	\$1595.95
MOD4 16K	
<b>INTERM4</b>	\$1695.95
MOD5 32K	
<b>INTERM5</b>	\$1995.95
2ND DISK DRIVE	
<b>INTERM6</b>	\$ 399.95
LOWER CASE OPTION	
<b>INTERM</b>	\$ 149.95
RS232 ADAPTER CABLE	
<b>INTERM</b>	\$ 44.95
<b>DISK FORMATTING PROGRAM</b>	
<b>INTERM11</b>	\$ 24.95
MATH TUTOR	
<b>INTERM12</b>	\$ 19.95
STAR TREK	
<b>INTERM13</b>	\$ 19.95
HANGMAN	
<b>INTERM14</b>	\$ 19.95
CHESS	
<b>INTERM15</b>	\$ 19.95
OTHELLO	
<b>INTERM16</b>	\$ 19.95
TEXT EDITOR	
<b>INTERM17</b>	\$ 24.95
ASSEMBLER FOR 8080	
<b>INTERM18</b>	\$ 24.95
BLACK JACK	
<b>INTERM19</b>	\$ 19.95
CUBIC TIC TAC TOE	
<b>INTERM20</b>	\$ 19.95
PERSONAL FIN. VOL. 1	
<b>INTERM21</b>	\$ 19.95
PERSONAL FIN. VOL. 2	
<b>INTERM22</b>	\$ 19.95
BONDS AND SECURITIES	
<b>INTERM23</b>	\$ 19.95
EQUITY	
<b>INTERM24</b>	\$ 19.95
PERSONAL DATA BASE	
<b>INTERM25</b>	\$ 39.95
INCOME TAX	
<b>INTERM26</b>	\$ 29.95
BASIC LAG. 1	
<b>INTERM27</b>	\$ 19.95



101 KEY OPTION  
**INTERM7** ..... \$ 134.95



117 KEY OPTION  
**INTERM** ..... \$ 179.95

BASIC LAG. 2  
**INTERM28** ..... \$ 19.95  
SWARMS  
**INTERM29** ..... \$ 19.95  
HANGMAN  
**INTERM30** ..... \$ 19.95

## COMPUCOLOR II (16K)

**SPACE: 2020** You try to trade with planets in different systems to raise enough money to retire. While you're trying to accomplish this your starship is almost constantly under attack by alien raiders that you must fight in order to complete your mission. During the game, you may decide to Invest part of your increasing wealth into the improvement of your ship which could mean adding a missile, more lasers, or more fuel and cargo pods. In addition to all this, you have the option at the beginning of each game to create a new universe.

**GWS20I** ..... \$ 24.95

**DUNGEON QUEST** As your fearless hero descends into the catacombs of the dungeon, you must guide him so that he can survive to destroy an evil magician. This is easier said than done, since you must fight a small army of horrible monsters before you can destroy the magician. In the beginning of the game you will be asked whether your character will be a priest or just a fighter. Priests have extra abilities, but do not fight as well. When you have to do battle you must try and decide which weapon to use, depending on the situation.

**GWPQI** ..... \$ 19.95

**LIGHTNING COMMAND** As the great enemy panzer army rolls onto your home country, you must outmaneuver him. This is a two player game of skill. Each player will begin with the same number of men, and the same amount of money, so that it's perfectly balanced.

**GWLCI** ..... \$ 19.95

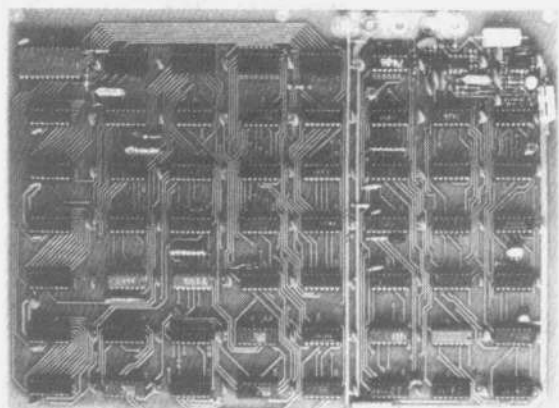
## COMP-U-WRITER WORD PROCESSOR

The COMP-U-WRITER WORD PROCESSOR can satisfy both the experienced and novice computer user. For the experienced computer buff it is a powerful screen editor and file-structure system complete with WORD WRAP and CURSOR EDITING. The operator can make corrections in the text without having to retype the entire document. (The COMP-U-WRITER requires a 16K or 32K CompuColor II, a 117 keyboard, and lowercase characters. Since the CompuColor II has an RS-232 port most printers can easily be made compatible.)

**CVWFC 117** ..... \$249.95

# DIGITAL KITS

## TELEVISION TYPEWRITER



Stand alone TVT • 32 char/line, 16 lines, modifications for 64 char/line included • Parallel ASCII (TTL) input • Video output • 1K on board memory • Auto scroll • Non-destructive cursor • Cursor inputs: up, down, left, right, home, EOL, EOS • Scroll up, down • Requires +5 volts and -12 volts • All 7400, TTL chips • Char. gen. 513 • Upper case only • If an (RO-3-2513) is used instead of the 2513 then the -12 volt supply is not need.

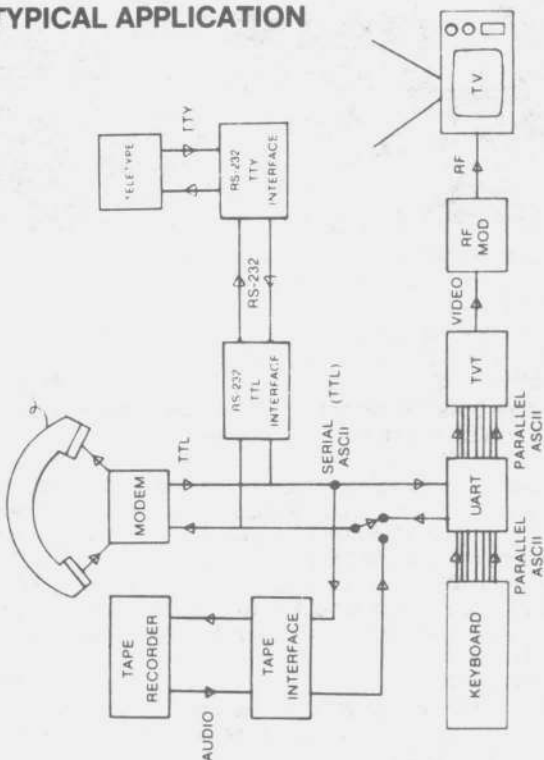
BOARD ONLY

106 ..... \$ 39.95

WITH PARTS

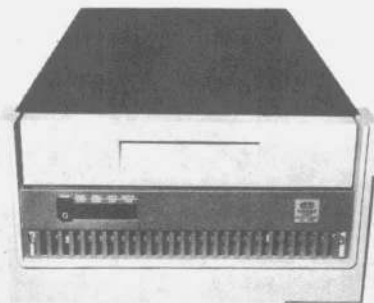
106A ..... \$145.95

## TYPICAL APPLICATION



# DISK DRIVES

THE CONTROL DATA "PHOENIX":  
STORAGE AND BACKUP IN ONE  
DISK DRIVE.



The CDC "Phoenix" features 16 megabytes of fixed storage (which can be expanded to 48 or 80 magabytes) plus a 16 megabyte removable cartridge. Should data on the fixed portion be lost for any reason, the back-up cartridge can be copied and the data retrieved. Thus the "Phoenix" can be used in professional applications without the need for a separate back up system.

WITH ALPHA MICRO DOS

CDCA3212A ..... \$8999.95

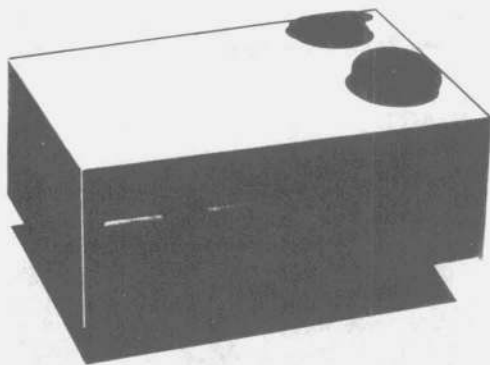
WITH NORTH STAR DOS

CDCA3212N ..... \$8999.95

ADDITIONAL DRIVE

CDCA32211 ..... \$6999.95

## DIGIDISK™



Digicom's new **DIGIDISK™** is a microprocessor based mini-floppy disk system that performs as a paper tape and magnetic tape cassette emulator. And it really does much more...it's also ideal for data storage, automatic send/receive program loading and customer oriented data collection applications.

DIGIDISK MODEL DD10 WITH DUAL RS232 I/O

DG0020 ..... \$1495.95

DIGIDISK MODEL DD20 WITH 300 BAUD COUPLER

DG0021 ..... \$1395.95

## MICROPOLIS



**Four Drive 1054 MOD II** Four-disk system with 1,250,000 bytes (formatted) on line storage capacity.

**MCRA30731** ..... \$2795.95

**Dual Drive 1053 MOD II** Two-disk system with 630,000 bytes (formatted) of on line storage capacity.

**MCRA30198** ..... \$1595.95

**Single Drive 1043 MOD II** One-disk system with 315,000 bytes (formatted) of on line storage capacity.

**MCRA30197** ..... \$ 979.95

**Single Drive 1041 MOD II** One disk system with 315,000 bytes (formatted) of on line storage capacity. Requires DC regulator kit, part number 1091-01, to convert S-100 bus DC supplies to voltage necessary for the drive module.

**MCRA30734** ..... \$ 929.95

**Dual Add-on 1033 MOD II** Two-disk 630,000 byte add-on storage module with enclosure and power supply. Requires daisy chain cable.

**MCRA30199** ..... \$1148.95

**Single Add-on 1023 MOD II** One-disk 315,000 byte add-on storage module with enclosure and power storage. Requires daisy chain cable.

**MCRA30732** ..... \$ 539.95

**Single Add-on 1021 MOD II** One-disk 315,000 byte add-on storage module with enclosure. Requires daisy chain cable and regulator kit.

**MCRA30735** ..... \$ 479.95

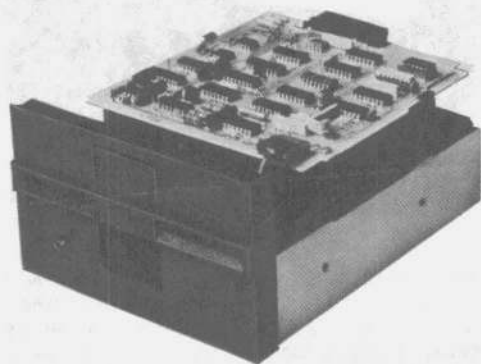
**Single Drive 77 Track**, with power supply chassis, cable and TRS-80 DOS.

**370MIC** ..... \$ 679.95

**Single Drive 77 track**, with power supply, and chassis.

**372MIC** ..... \$ 619.95

## SHUGART



SA800-8 IN.

**153SA** ..... \$479.95

SA400 5.25 IN.

**1505A** ..... \$282.95

## MATCHLESS SYSTEMS MINI DISK



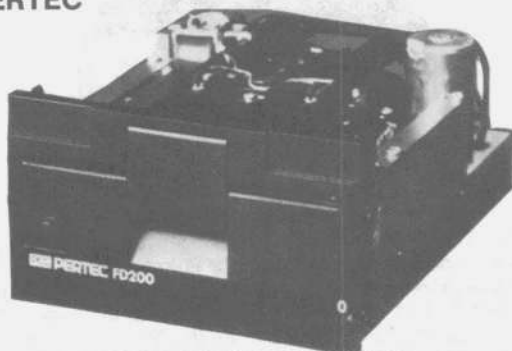
The MS-80 add-on drives plug right into the TRS-80 expansion unit. Each add-on drive includes: One minifloppy disk drive, case, power supply, and regulator board. What's more, it also includes a cable. 40 tracks versus 35 increases your usable storage capacity 23% from 55,000 to 67,800 bytes on the first drive. The Matchless MS-80's exclusive band-positioning design sets an industry standard for fast and accurate positioning. Track to track access time is only five (5) milliseconds, which is more than twice as fast as the nearest competitor.

**DOES NOT VOID TRS-80 WARRANTY** The MS-80 has a 90-day warranty (parts and labor included). Moreover, the MS-80 is completely compatible with the TRS-80 DOS. The MS-80 truly is the Cadillac of the TRS-80 add-ons. Simply take it out of the box, plug it in and you're ready to run.

**TYPICAL QUESTIONS AND ANSWERS:** **Q.** Your drive has 40 tracks. The Radio Shack DOS is only 35. How can I use your drive with their 35-track DOS? **A.** Ours is 40, but the additional 5 tracks are the inner portion of the diskette. All Radio Shack Software is completely compatible. **Q.** Can I mix your drives with Radio Shack drives? **A.** Yes! You can mix and match in any sequence or position. **Q.** Can I read a diskette made on a Radio Shack drive, on your drive or vice-versa? **A.** Yes! Our drives are completely compatible with the TRS-80 DOS. DOS.

**MS80** ..... \$359.95

## PERTEC



FD200 WITH POWER SUPPLY AND CHASSIS

**355TFI** ..... \$382.95

WITH CABLE

**358TF2** ..... \$414.95

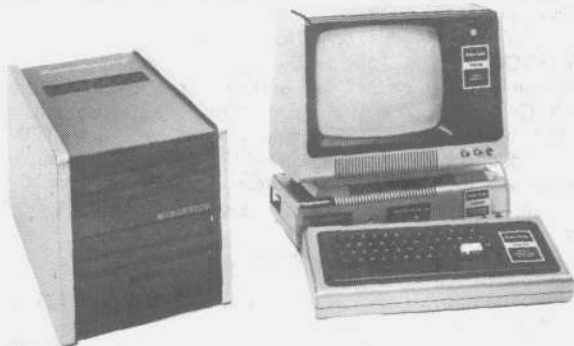
250 DUAL HEAD

**345TFI** ..... \$499.95

POWER SUPPLY AND CABLE

**348TFP** ..... \$549.95

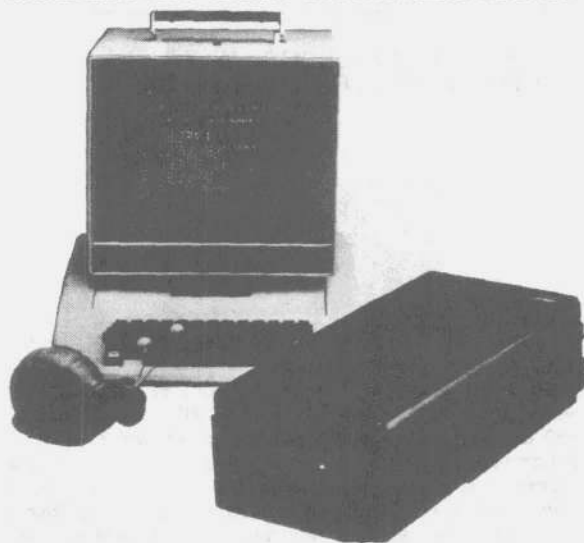
## 8" FLOPPY ADD ON



Dual 8", double density single sided micromation megabox.

1 MEG.	
<b>AMEGBOX</b>	<b>\$2249.95</b>
SAME AS ABOVE DOUBLE SIDED 2 MEG.	
<b>2MEGBOX</b>	<b>\$3055.95</b>
1 MEG. RACK MOUNT	
<b>1MEGBOXRM</b>	<b>\$2249.95</b>
2MEG RACK MOUNT	
<b>2MEGBOXRM</b>	<b>\$3055.95</b>

## WINCHESTER 10Mb FOR APPLE & TRS-80

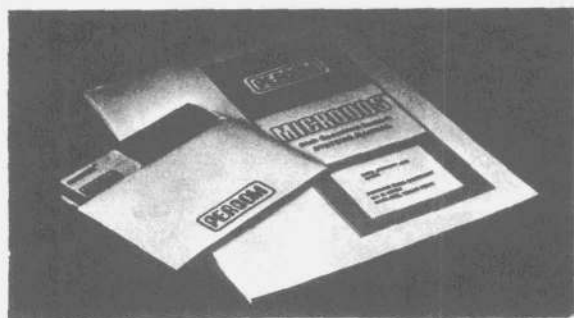


Plug compatible with the Radio Shack TRS-80, the Apple II and all S-100 bus computers, is the Corvus Intelligent Disk System, providing 50 times the capacity and 10 times the speed of currently available microcomputer memory devices.

The system utilizes the IMI 7710 disk drive with two 8" hard disks, a Corvus intelligent disk controller, Z-80 based, with comprehensive disk diagnostics intelligent personality module and associated software for each type of computer. Each drive has up to 10Mb of formatted storage. Up to four drives can be supported in a simple daisy chain. Includes disk drive, controller and personality module.

TRS-80	
<b>TRS8010MB</b>	<b>\$4995.95</b>
APPLE	
<b>AP10MB</b>	<b>\$4995.95</b>
S-100	
<b>S10010MB</b>	<b>\$4995.95</b>
ADD-ON DISK DRIVES	
<b>10MBCOR</b>	<b>\$2990.95</b>

## MICRODOS™—A BASIC LANGUAGE DOS FOR YOUR TRS-80\*



Developed especially for business and professional applications that use Percom's TFD mini-disk drive systems for storage, MICRODOS™ is both faster and more powerful than TRSDOS\*, which it replaces, yet resides in less than 7K bytes of RAM.

MICRODOS™ is supplied on a system diskette that includes three self-teaching BASIC programs: (1) a file management program, (2) a program which illustrates how disk utilities may be written with only a few BASIC statements, and (3) a sample application program entitled "The Percom 5 1/4 Inch Notebook," a disk-based "notebook" of information about MICRODOS™ disk BASIC statements. The "notebook" may be easily accessed or changed by the user. A menu of system disk programs is activated by power-up or reset.

MICRODOS™ permits the use of hexadecimal constants in expressions, and the user may add up to 10 of his own special functions to existing functions.

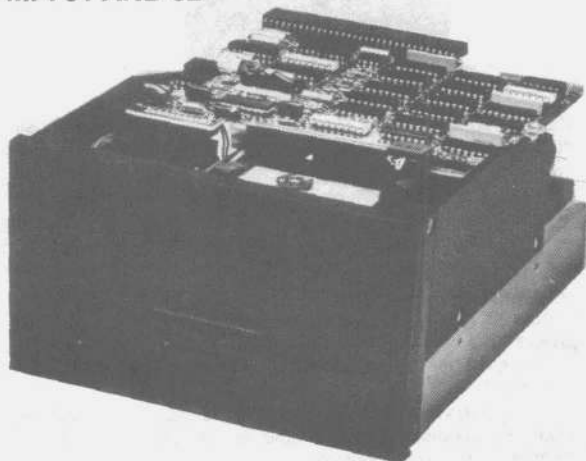
MICRODOS™ OPERATING SYSTEM

**TFD1011** ..... \$ 29.95

## HAWK DRIVE

Call for price

## MPI 51 AND 52



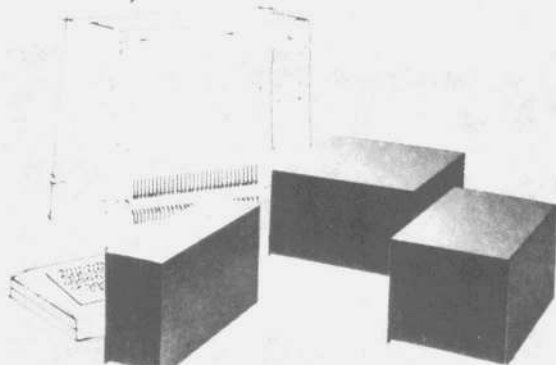
Track to track access time is 5 milliseconds. **Model 51:** Single density (unformatted), • Per disk:  $125 \times 10^3$  bytes • Per track:  $3.13 \times 10^3$  bytes • Double density (unformatted), • Per disk:  $250 \times 10^3$  bytes • Per track:  $6.25 \times 10^3$  bytes.

**160MPI** ..... **\$279.95**

**Model 52:** Single density (unformatted), • Per disk:  $218.8 \times 10^3$  bytes • Double density (unformatted), • Per disk:  $437.5 \times 10^3$  bytes

**162MPI** ..... **\$349.95**

## TFD-100™, TFD-200™



The TFD-100™ and TFD-200™ drive systems are ready to use the minute they arrive. You'll need a disk operating system such as TRSDOS\* or MICRODOS,™ Level II BASIC, 16K of RAM and an interconnecting cable. An interconnecting cable may be purchased from Percom if you don't already have one.

PATCH PAK 1™, which is supplied free (on disk) with the purchase of a drive, both extends TRSDOS\*—to accommodate 40- and 77-track drives—and improves it. With the patch applied, the problem of interference with disk operations caused by the TRS-80™ "Heartbeat" pulse is eliminated. And

with PATCH PAK 1™, most of the so-called "silent death"—premature stopping of the drive motor during operation—is also eliminated.

PATCH PAK 1™ is applied to your system disk (containing TRSDOS\* version 2.1) "on the fly" using two drives, one containing your system disk and the other containing the PATCH PAK 1™ disk. Application instructions are included.

• TFD-100™ data capacity (formatted)—102.4K bytes/side • TFD-200™ data capacity (formatted)—197.12K bytes • Recoverable error rate—1 per 10<sup>9</sup> • Non-recoverable error rate—1 per 10<sup>12</sup> • Data transfer rate—250K bits per second • Seek time (track to track)—30 ms.

TFD-100™ (40-track)

SINGLE-DRIVE

TFD1001 ..... \$ 379.95

DOUBLE-DRIVE

TFD1002 ..... \$ 795.95

TRIPLE-DRIVE

TFD1003 ..... \$1195.95

TFD-200™ (77-track)

SINGLE DRIVE

TFD1004 ..... \$ 659.95

DOUBLE-DRIVE

TFD1005 ..... \$1349.95

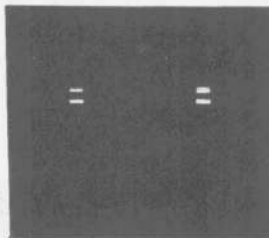
TRIPLE-DRIVE

TFD1006 ..... \$2025.95

(the above prices include the drive system with power supply, the enclosure and PATCH PAK #1™)

## COMPUTHINK

\*\*\*\*\*



**Expand your Pet.** Disk Drives: Choose either double density 400k or dual head double density 800k on-line disk drive. Both with DOS operating system including 17 additional BASIC commands and random or indexed sequential access.

Exceptionally fast 5,000 bytes per second (including verify) transfer speed lets you load 20K program in just 3 seconds. Model 8K must have Expandamem™ to operate disk drives. All other models are plug compatible.

**Expandamem™.** Lets expand the size and scope of your programs. 16K, 24K, and 32K internal memory boards give you 8K of assembly language subroutines accessed via the USR command.

**Expand your TRS-80.** Disk Drive: Single density dual head 400K on-line disk drive is completely compatible with TRS-80 DOS and uses own controller.

400K DISK DRIVES (PET AND TRS-80)

CUMP400 ..... \$1195.95

800K DISK DRIVE

CUMP800 ..... \$1495.95

16K EXPANDAMEM™

CUMP16K ..... \$ 425.95

24K EXPANDAMEM™

CUMP24K ..... \$ 525.95

32K EXPANDAMEM™

CUMP32K ..... \$ 615.95

## 950/951 MICRO-DISCS WIDE PERFORMANCE RS-232 MINIDISCS



Techtran 950 and 951 Micro-Discs are micro processor-intelligent, minidiskette systems featuring over 200,000 usable character storage. They are the perfect RS232 addition for sophisticated but simple operation at remarkable cost savings.

**950 MICRO DISC No. of Drives:** One **Recording Method:**

Automatic directory control; unrestricted file lengths. **Binary**

**Mode:** Code transparent operations; limited remote control.

**Write Protect:** Automatic jacket notch sense. **Online/Offline:**

Automatic online activate; manual override. **Indicator:** Read;

Write; Ready. **operating Modes:** Read/Write File; Read/Delete

Directory; Batch; Binary. **Remote Control:** Read/Write File;

Delete Directory; Edit; DC1-DC4. **Data Edit:** Character delete

with printout control. **Controls:** Binary/Online/Offline; Half/Full;

Rate; Binary Control On/Odd/Even; Power. **Storage Capacity:**

200, 192 characters per diskette; one side. **Storage Media:** 5.25"

minidiskettes. **Transmission:** Half/Full duplex; asynchronous.

**Transmission Rates:** 110, 300, 1200, 2400, 4800, 9600, EXT.;

switch selectable. **951 MICRO DISC SAME AS ABOVE WITH**

Editor; Line Mode. **Remote Control:** Disc Editor; Partial Backup;

Search. **Data Edit:** Add, delete or replace data on disc using

single commands; automatic retrieval/disc update control.

**String Search:** High speed scan for up to 15 character string.

**Line Mode:** Activated line by-line readout; provides data

expansion mode.

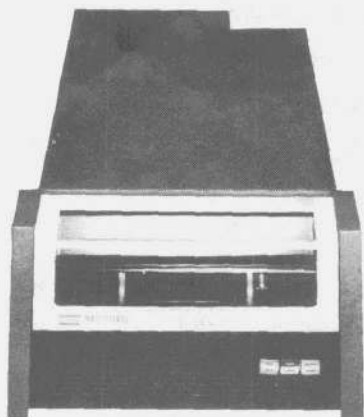
MOD. 950

TEC950 ..... \$1395.95

MOD.951

TEC951 ..... \$1995.95

## THE FUJITSU M2201



**40 formatted megabytes on line** The Fujitsu M2201 provides the latest disk drive technology backed by nationwide service and support. A 2400 RPM rotation combined with a quick seek time, and a relatively low latency time, give the M2201 a speedy average access time of 30 milliseconds. The ease of front loading and simplified mechanical design combine to make the M2201 a logical high-performance choice.

NORTH STAR DOS

FUJA3212N ..... \$8499.95

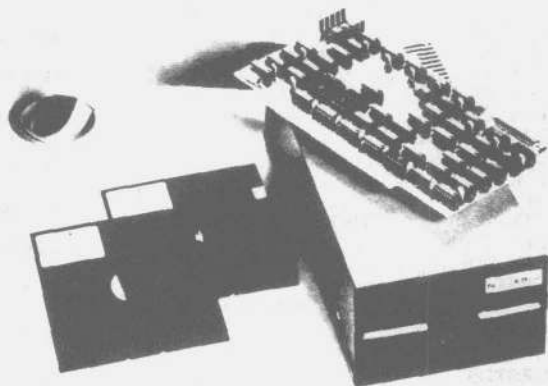
ALPHA MICRO DOS

FUJA3212A ..... \$8499.95

ADDITIONAL DRIVE

FUJA32111 ..... \$5999.95

## NORTH STAR DOUBLE DENSITY



The double density drive is hard-sectored for 512 byte records. Each diskette can store 180K bytes of information, formatted as 35 tracks with 10 sectors per track. Track-to-track access is 40ms and latency is 100ms. The data transfer rate is 250K bits per second. These figures mean that 16K bytes of data can be transferred in less than one second, and that a single diskette can hold over 100 typical BASIC programs.

1ST DRIVE + CONTROL BOARD (ASSEMBLED AND TESTED) DOUBLE DENSITY

NORA30224D ..... \$699.95

2ND DRIVE W/REG SACK (ASSEMBLED AND TESTED) DOUBLE DENSITY

NORA30725D ..... \$439.95

## ELF

### QUEST SUPER ELF COMPUTER



- Single board microcomputer
- Fully expandable
- ROM Monitor
- Video Graphics
- 24 key hex keyboard
- Digital Displays
- Expansion busses
- Power supply included
- Case optional

The Super Elf is plainly the lowest cost, best value in a beginning computer on the market today. It connects easily to your own TV with an inexpensive RF modulator. It will provide you with many hours of enjoyment through its games, graphics and music. You can do your own programming if you wish. In addition, the Super Elf gives you the opportunity to really understand your computer. Very few computers on the market

today allow you to see what is going on inside the computer, see the state and modes operating, the addressing, and how to program.

The kit comes with a complete operating and assembly manual with a 30 page software section. A large number of programs are already available in several books and through a monthly publication called *QUESTDATE*.

The Super Elf is completely expandable, allowing you to add capability at your own pace. Some examples are: Additional memory, Full BASIC, ASCII Keyboard and Color Video.

PRICES NEXT PAGE



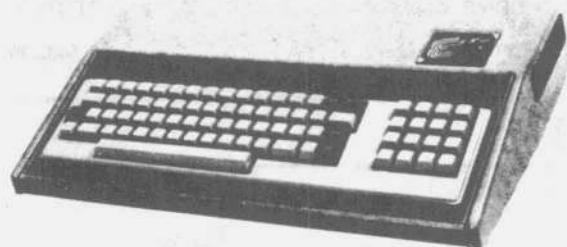
## ELF, SUPER CONT'D

SUPER ELF BASIC SYSTEM—COMPLETE KIT	
QUESTOIK .....	\$106.95
SUPER ELF KIT—ASSEMBLED	
QUESTOIA .....	\$131.95
HIGH ADDRESS	
QUESTO2 .....	\$ 8.95
LOW ADDRESS	
QUESTO3 .....	\$ 9.95
MEMORY SAVER	
QUESTO4 .....	\$ 6.95
WOOD GRAIN CABINET	
QUESTO5 .....	\$24.95
RF MODULATOR	
QUESTO6 .....	\$ 8.95
SOFTWARE—ELF MUSIC AND GAMES	
QUESTO7 .....	\$ 2.95
ELF GRAPHICS	
QUESTO8 .....	\$ 3.95
CHIP-8 INTERPRETER	
QUESTO9 .....	\$ 5.95
QUESTDATE SUBSCRIPTION	
QUEST10 .....	\$12.95

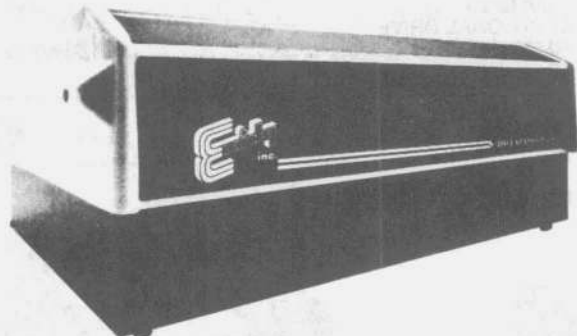
SUPER EXPANSION KIT	
QUEST11 .....	\$ 89.95
SUPER ROM MONITOR—VERSION 1	
QUEST12 .....	\$ 19.95
SUPER ROM MONITOR—VERSION 2	
QUEST13 .....	\$24.95
PARALLEL I/O PORTS	
QUEST14 .....	\$ 9.95
RS232	
QUEST15 .....	\$ 4.95
TTY20MA	
QUEST16 .....	\$ 1.95
POWER SUPPLY	
QUEST17 .....	\$29.95
SUPER WOODGRAIN CABINET	
QUEST18 .....	\$46.95
TINY BASIC CASSETTE	
QUEST19 .....	\$ 7.95
TINY BASIC ROM	
QUEST20 .....	\$26.95
SUPER BASIC CASSETTE	
QUEST21 .....	\$40.95

## EXIDY

## EXIDY SORCERER COMPUTER



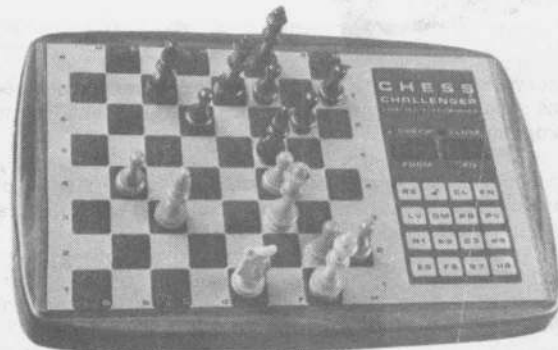
8K	
EXIA11872 .....	\$ 839.95
16K	
EXIA11880 .....	\$ 999.95
32K	
EXIA11898 .....	\$1079.95



S-100 EXPANSION UNIT MOD #	
DP1004-BS0003 .....	\$ 329.95

## GAMES

## CHESS CHALLENGER

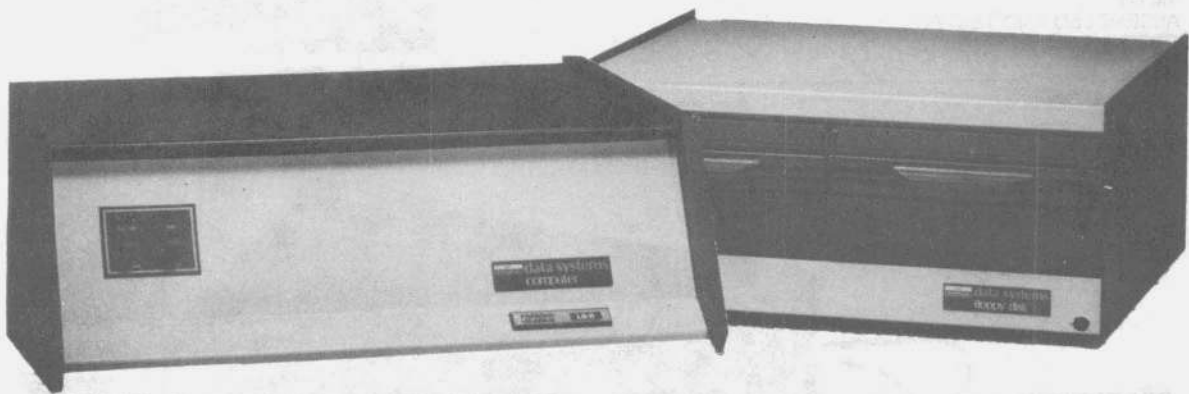


CHESS CHALLENGER I-1 LEVEL	
FID-A-10106 .....	\$ 190.95
VOICE CHESS CHALLENGER	
FID-A-11940 .....	\$ 278.95
CHESS CHALLENGER-10 LEVELS	
FID-A-10812 .....	\$ 235.95
CHESS CHALLENGER-7 LEVELS	
FID-A-12220 .....	\$ 99.95

<b>CHECKER CHALLENGER®</b>	
CHECKER CHALLENGER 4 LEVELS	
FID-A-11169 .....	\$ 139.95
CHECKER CHALLENGER 2 LEVELS	
FID-A-11168 .....	\$ 59.95
BACKGAMMON	
FID-A-11170 .....	\$ 88.95

<b>BRIDGE CHALLENGER®</b>	
BRIDGE CHALLENGER	
FID-A-11942 .....	\$278.95

## 16 BIT HEATH COMPUTER (DEC LSI-11)



**DISKETTE**—Capacity (8-bit bytes, IBM 3740 format): Per diskette, 256, 256 bytes; per track, 3,328 bytes; per sector, 128 bytes; Recording Surfaces Per Diskette: 1; Tracks per Diskette: 77 (0-76) or (0-114<sub>g</sub>); Sectors Per Track: 26 (1-26) or (1-32<sub>g</sub>); Bit Density: 3200 bpi at inner track; Track Density: 48 tracks per inch; Recording Technique: Double frequency. **DATA TRANSFER RATE**—Diskette To Controller Buffer: 4us/data bit (250K bps); Track-to-Track Move: 6 ms/track maximum; Head Settle Time: 15 ms maximum; Rotational Speed: 360 rpm  $\pm$ 2.5%, 166 ms/revolution nominal; Average Access: 252 ms, (Seek) (77 tks/3) x (Settle) 3 ms + 15 ms + tks/3) x (Settle) 3 ms + 15 ms + (Rotate) (166 ms/2) = (Total) 252 ms. **TEMPERATURE**—Operating: 15- to 32-C (59- to 90-F) ambient, maximum temperature gradient = 20-F/hr (11.1-C/hr); Non-Operating: 25-C (77-F) maximum wet bulb, 2-25-C (36-F) minimum dew point, 20% to 80% relative humidity; Non-Operating: 5% to 98% relative humidity (no condensation); Diskette Non-Operating: 10% to 80% relative humidity. **POWER**—Floppy Disk: 100-135 volts or 200-270 volts, 60 Hz, 240 watts maximum; Interface

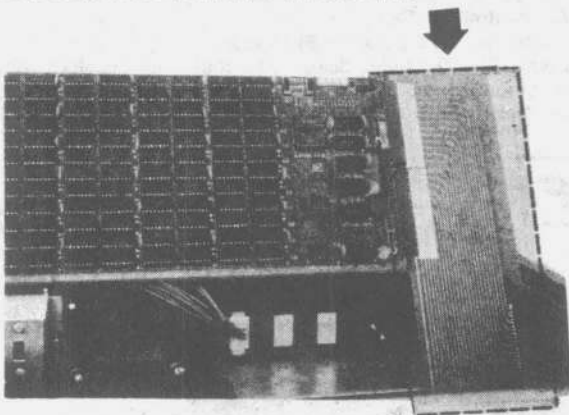
Module: 1.5A maximum, 1 A typical, at 5 VDC. **PHYSICAL**—Overall Dimensions: 18"W x 20 3/4" D x 7 3/4"H (45.7 cm x 19.7cm); Net Weight: 61 lbs. (27.67 kgs). \$4999.95

**CPU AND MEMORY**—Central Processing Unit: Uses DEC KD11-HA CPU; Word Length: 16 bits; Instruction Set: PDP-1103; Memory: Directly addresses 32K; I/O Addressed: 28K to 32K; RAM/ROM: 0 to 28K; Backplane: Eight 2 wide module slots; Interrupt and DMA Priority: Determined by electrical position in backplane assembly. Power Supply; Overcurrent and overvoltage protected, switching regulator, internal fan for cooling; Inputs: 105 to 135 VAC or 210 to 270 VAC, 50-60 Hz, at 200 watts maximum; Outputs: +5 VDC at 15 amperes maximum and +12 VDC at 3 amperes maximum. Cabinet size (overall): 6 1/2" high x 19" wide x 17" deep. (16.5 x 48.3 x 43.2 cm); Net Weight: 43lbs. (19.5 kg).

### WH14 PRINTER WITH CABLE

HEAA32081 ..... \$ 795.95  
HEAA1221 ..... \$1999.95

## CK-020 H-8 EXTENDER BOARD



AT LAST! An extender board for the H-8 computer. Great for developmental work, repairs, or studying other circuitry ideas. Comes with connecting hardware to plug right in to your H-8. **GBCK020** ..... \$ 39.00

## HEATH—WH-19



WH19CRT  
HEAA32335 ..... \$ 895.95

## ECONORAM XV FOR HEATH H8 COMPUTER

32K x 8 Addressable on any 4K boundary. Low power, high speed static memory. Organized as two 16K blocks. Includes bank select feature so that you can have more than 56K on the H8.

ASSEMBLED AND TESTED

GB32H8 ..... \$719.95



## INTERACT



**Special Offer!** Buy Interact Family Computer for \$499.95—Get a 14 program tape library Free! A total \$800 system now only \$499.95

**Built in Cassette Deck:** Data may be written as well as load. Fast 1200-2000 bps, 3 to 5 times faster than other systems. Also can output sound from tape.

**Output:** Standard RF TV signal, including full color and sound, received on channel 3. Antenna switchbox provided. Output can be stored on Data Tape for specific programs.

• **For education:** Add Em Up, Knockdown, Hangman, Compute-A-Color, Biorhythm • **Adult strategy games:** Blackjack, Concentration • **Exciting action programs:** Dogfight, Trailblazers, Showdown, Computer Maze and Regatta. Interact will also send you the 14th program, Breakthrough, upon

receipt of your warranty card • **Interact Microchess** (designed by Peter Jennings): Play tournament-style chess against the computer. With en passant, pawn promotion and castling • **Backgammon:** Play this ancient game of skill and chance against the computer • **Star Track:** The legendary computer game: destroy the Klingon raiders before they destroy the Enterprise or you run out of time • **Video Chess:** Play chess against your opponent, use the TV as the game board and save the game record on tape for later replay and analysis • **Concentration:** Test your memory and match the hidden shapes behind the doors • **Blackjack:** Las Vegas casino fun at home. The computer deals—you could win big. Excellent graphics and sounds • **Reversi:** Surround your enemy's pieces, but watch out for last-minute reverses.

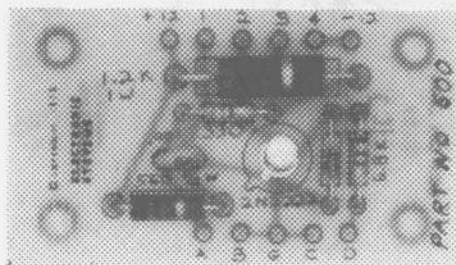
## INTERFACE

### RS-232/TTY INTERFACE

This board has two active circuits, one converts RS-232 to 20 mA, and the other converts 20 mA to RS-232. Requires +12 and -12 volts.

KIT

600A ..... \$ 9.95

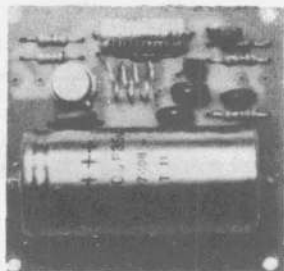


## RS-232 OR 8-BIT PARALLEL TO DIABLO HYTYPE II

This interface is an intelligent plug-in board for series 1300 Diablo HyType II daisy wheel printers. With its on-board microcomputer, it allows any ASCII device with RS-232, 20mA current loop, or 8-bit parallel output to fully control a HyType II printer. This board eliminates the hardware and software task of interfacing the 28 data and handshaking signals to your system. Serial data rate is switch selectable to any of 16 standard values from 50 to 19,200 baud. Word length and parity features are also switch selectable. Complete handshaking signals allow your host system to transfer data at rates faster than printing speed, by buffering up to 1000 characters in the on-board memory. This board plugs into any spare slot in the printer, and utilizes the printer power buss. Custom features available, such as print formatting, Baudot, EIA, ISO or EBCDIC interfacing, and more.

2118415 ..... \$275.95

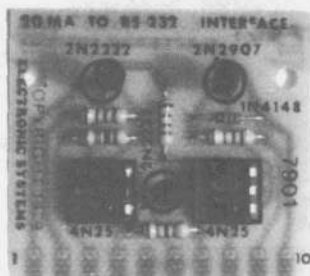
## TV INTERFACE



Converts video to AM modulated RF, Channels 2 or 3. On-board regulated power supply makes this extremely stable. Rated very highly in Doctor Dobbs' Journal. Recommended by Apple • Power required is 12 volts AC C.T., or +5 volts DC.

BOARD ONLY  
107 ..... \$ 7.95  
WITH PARTS  
107A ..... \$13.95

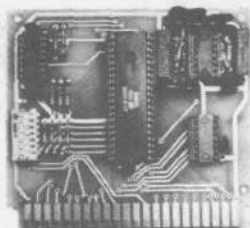
## RS-232/20 mA INTERFACE



This board has two passive, opto-isolated circuits. One converts RS-232 to 20 mA, the other converts 20 mA to RS-232. All connections go to a 10 pin edge connector. Requires +12 and and -12 volts.

KIT  
7901A ..... \$ 14.95  
10 PIN EDGE CONNECTOR  
10P ..... \$ 2.95

## SERIAL/PARALLEL INTERFACE

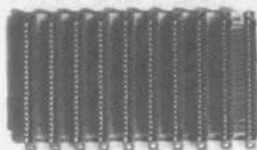


This circuit converts serial to parallel, and parallel to serial. The low cost on board baud rate generator produces baud rates of: 110, 150, 300, 600, 1200 and 2400. The seven section dip switch selects the polarity of the input, and output strobe separately, odd or even parity, 5 to 8 data bits, 1 or 2 stop bit, and either parity or no parity. All characters contain a start bit. Power required is +5 and -12 volts at very low power. It is TTL compatible, and all connections go to a 44 pin edge connector.

If the AY-S-1014 is used instead of the AY-5-1013A, there is no need for the -12 volt supply.

BOARD ONLY  
101 ..... \$ 11.95  
WITH PARTS  
101A with AY51013A ..... \$ 35.95  
101B with AY51014 ..... \$ 39.95  
EDGE CONNECTOR  
44P ..... \$ 3.95

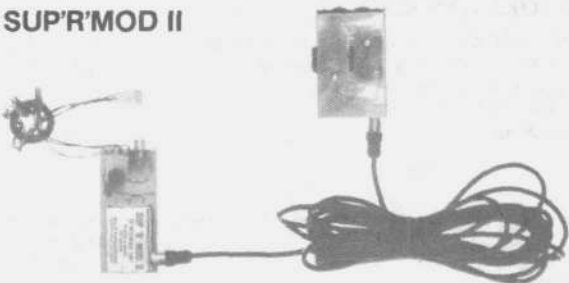
## 44 BUS MOTHER BOARD



Originally designed as an expansion bus for an Apple 1 computer. It has provisions for ten 44 pin (.156) connectors, spaced 3/4 of an inch apart. pin 20 is connected to X, and 22 is connected to Z for power and ground. All the other pins are connected in parallel. This board also has provisions for bypass capacitors.

102 ..... \$ 15.95  
CONNECTORS  
44WP ..... \$ 3.95

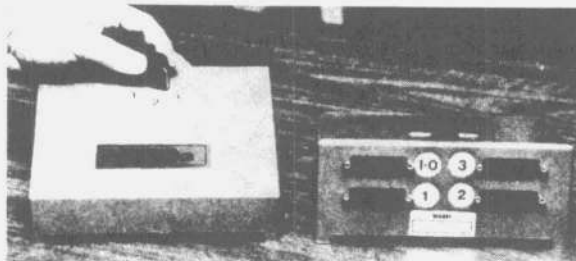
## SUP'R'MOD II



The SUP'R'MOD II is a wide band black and white or color compatible interface system intended to convert the home TV to a full video display for home computers, CCTV cameras and similar systems which output NTSC compatible composite video. The SUP'R'MOD II is pre-tuned to U.S. Channel 33 (UHF), includes a coaxial cable and antenna transformer, and in conjunction with a standard home TV set, insures safe isolation and high performance.

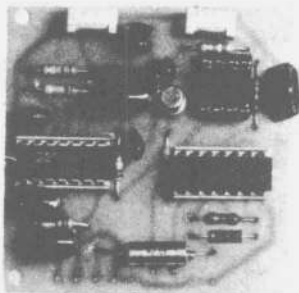
MNRA40314 ..... \$ 29.95

## RS-232 SWITCHER



Provides system versatility by connecting any RS-232 peripheral (line-printer, CRT, etc.) to any of three driving sources (computers); cascading two or more switchers expands the selection to five or more sources. One of a family of devices, the unit comes in a rigid case measuring 6 x 4 x 2 in. and weighs approximately 2 lbs.

**RS232X3** ..... \$ 99.95

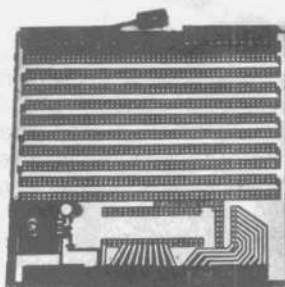
TAPE  
INTERFACE

This Tape Interface will convert a low cost tape recorder into a digital tape recorder. This circuit uses the XR-2211 FSK demodulator and works up to 1200 baud. The output of the Tape Interface connects to the "mic in" of a tape recorder, and the input of the Tape Interface connects to the "earphone" of the tape recorder. Digital in and out are TTL. Two frequency adjustments are required.

KIT

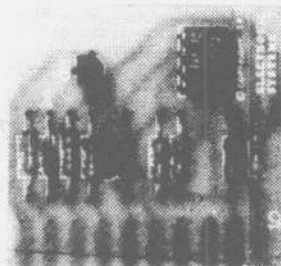
**111A** ..... \$ 29.95

## UIO UNIVERSAL I/O BOARD



The Micro Works Universal I/O Board is just the thing for custom interfaces. The board has space for a 40-pin wire wrap socket into which you may plug any of Motorola's 40 or 24-pin interface chips; the data and control lines are connected to the appropriate edge connector pins. All other bus connections are brought out to a 16-pin socket pad. A +5 volt regulator and all Molex connectors are provided; regulated +5 and ground are used among the locations for up to 35 14-pin ICs.

**UV106504** ..... \$ 24.95

RS-232/TTL  
INTERFACE

The RS-232 board has two separate circuits. One circuit converts RS-232 to TTL. The other converts TTL to RS-232. This board has a ten-pin edge connector. Power required is +12V and -12V.

10 PIN EDGE CONNECTOR

**232A** ..... \$ 9.95

10 PIN EDGE CONNECTOR

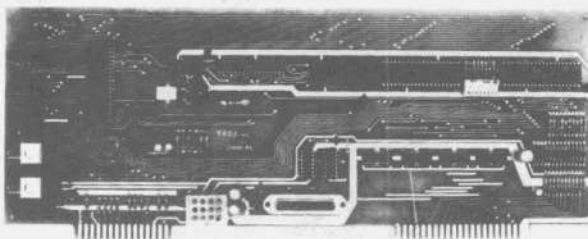
**10P** ..... \$ 2.95

ASCII TO CORRESPONDENCE  
CODE CONVERTER

This bidirectional board is a direct replacement for the board inside the Trendata 1000 terminal. The on board connector provides RS-232 serial in and out.

ASSEMBLED AND TESTED

**TA1000C** ..... \$249.95



## KEYBOARD

## HEX ENCODED KEYBOARD

This HEX keyboard has 19 keys, 16 encoded with 3 user definable. The encoded TTL outputs, 8-4-2-1 and STROBE are debounced and available in true and complement form. Four onboard LEDs indicate the HEX code generated for each key depression. The board requires a single +5 volt supply.



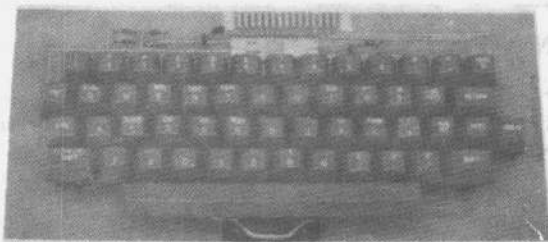
KIT

**HEX3A** ..... \$ 49.95

44 PIN EDGE CONNECTOR

**HEX44P** ..... \$ 3.95

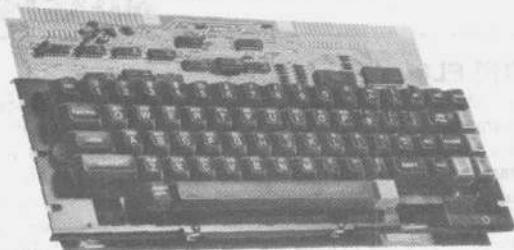
## GEORGE RISK ASCII KEYBOARD



53 Keys popular ASR-33 format • Rugged G-10 PC Board • Tri-mode MOS encoding • Two-Key Rollover • Low contact bounce • Selectable Parity • Custom Keycaps • George Risk Model 753 Requires +5, -12 volts.

753 ..... \$ 39.95

## CHERRY PRO ASCII KEYBOARD



TTL and DTL compatible • Full 67 key array • Full 128 character ASCII output • Positive logic with output resting low • Data Strobe • Five user-definable spare keys • Standard 22 pin dual card edge connector • Requires +5VDC, 325 mA.

ASSEMBLED AND TESTED

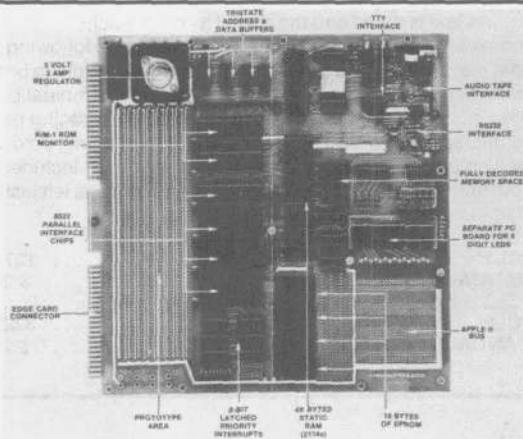
P7005AB ..... \$119.95

## KIM

### SUPER KIM

Tristate address and data buffers • TTY interface • Audio tape interface • Separate PC board for six digit leds • Apple II BUS • 16 bytes of EPROM • 4K bytes static RAM (2114s) • 8-bit latched priority interrupts • Prototype area • Edge card connector • Kim-1 ROM monitor • 5 volt 3 amp regulator.

MPK427 ..... \$379.95



## MEMORY

### MEMORY UP GRADE KITS



JUMPERS AND DOCUMENTATION INCLUDED

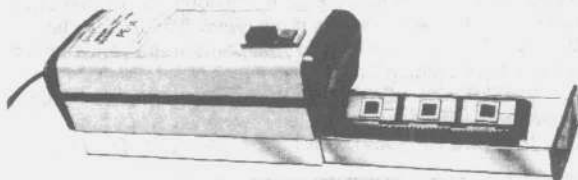
ITAUS016 ..... \$109.95  
 ITAUAP16 ..... \$109.95  
 ITAU8016 ..... \$109.95

### 16K RAMS

For the Apple, TRS-80 or Pet.

4116/2117 ..... \$7.95

### EPROM ERASING LAMP



• Erases up to 6 EPROM chips • Exclusive V-shape holding tray holds chips at a constant exposure distance • Conductive foam pad prevents electrostatic build-up and protects chips from possible static charge • Fast, complete erasing with high-intensity UV tube, specially-designed specular reflector and V-shape tray • Easy to operate—Plug unit into ordinary outlet, insert EPROM chips and slide in tray • Underwriters Laboratories Listed.

SPTA42389 ..... \$ 55.95

### EPROM ERASER

Erases EPROMS in 10 min., can erase 48 EPROMS at once.

BYTEDESTROYER

BYT375 ..... \$ 37.95

# MICRODASYS

## THE ELECTRIC PENCIL

The MicroDaSys Electric Pencil word processor package is a character oriented word processing system. This means that text is entered as a string of continuous characters and is manipulated as such. This gives you enormous freedom and ease in the movement and handling of text. Any number of characters, words, lines or paragraphs may be inserted or deleted anywhere in the text. The entirety of the text shifts and opens up or closes as needed in full view. The typing of carriage returns or word hyphenations is not required since lines of text are formatted automatically.

**CENTERING** is easier than saying the word! Using The Electric Pencil and Spinwriter printer, you can control the margins right within your text, you can type in bold type, you can underline, (do both), and put titles and page numbers on your documents. The word processing package lets you search and/or change strings, move blocks of text, insert words, sentences and paragraphs, and all changes appear on the screen accordingly!

As text is typed and the end of a line is reached, a partially completed word is shifted to the beginning of the following line. Text may be reviewed at will by variable speed scrolling both in the forward and reverse directions. Numerous combinations of line length, page length, line spacing and page spacing permit automatic formatting of any form. Character spacing, bold face, multicolumn and bi-directional printing are included in Spinwriter version. Multiple columns with right and left justified margins may be printed in a single pass.

PCL1 is for the NEC Spinwriter printer.

PCL1*	\$275.95
MANUAL**	\$ 20.95
PCL2 is for all other types of printer.	
PCL2*	\$225.95
MANUAL**	\$ 19.95

## WHAT'S IT

The MicroDaSys What's It data base package lets your SYSTEM-Z learn simple facts...recall them on request...and respond meaningfully in pidgin English to your questions and statements. The user manual tells you how, with step by step instructions you can follow even if you don't know a disk drive from a disk brake. If you can run a typewriter, you can talk to What's It. And it will talk back to you. You can store and retrieve data by typing pidgin English sentences like:

WHEN'S DR. JEKYLL'S APPOINTMENT? And it might answer you with a sentence like:  
DR. JEKYLL'S APPOINTMENT'S FRIDAY AT MIDNIGHT

## LETTER WRITER PACKAGE

The MicroDaSys Letter Writer Package helps you send out those letters using any name and address file you have—maybe Payroll, Accounts Receivable, or your own file. Maintain multiple letter files, insert names and address file, and generate mailing labels, too. The Letter Writer Package Features: • Letter edited with your text editor • Letter printer programs prints previously created letters for multiple names • Can insert the name throughout the body of the letter • Can take the name and address and other data from any user file you already have

\*This price includes manual and complete documentation.

\*\*The user's manual can be purchased separately. We will apply this amount towards your purchase of the package.

## INVENTORY

The MicroDaSys Inventory is a series of computer programs that carry out the INVENTORY CONTROL functions for a small business. There is an inventory transactions file and a master file. The data employed are the following: •Item number and description •Quantity on hand •Quantity on order and delivery date •Unit price and name of units used •Lead time, Reorder point and Safety stock •ABC class describing frequency of usage •Vendor name •Job allocation. Each transaction is identified by entering the quantity issued or received, current price and job or work order classification for an issue. The program will accumulate the transactions: current average cost, LIFO (Last-In First Out) cost, year-to-date usage and job cost allocation will be updated.

At any time you may ask for: • Stock Analysis Report, showing your standard inventory stock data and stock valuation •ABC Analysis, breaking down the inventory into groups separated by frequency of usage • Job Cost Report/Materials, showing totals allocated to each job or work code used. When this report is used jointly with Job Cost Report/Personnel in General Ledger-Level I, you get complete job cost control. • Economic (or Optimal) Order Quantities for all items for which you have cost of placing and order, expected annual demand and annual inventory carrying cost available.

Finally, all inventory receipt or issue transactions will be journalized and made available to General Ledger-Level I for automatic entering into your trail balance, posting and financial reports.

### SOFTWARE PACKAGE: INVENTORY

INV*	\$140.95
MANUAL**	\$ 9.95

What's It is a "system". Thanks to its "self-indexing" What's It shapes its personality to your own needs...learning to talk back and forth with you in the same key words and phrases it sees you using. Your words. Its file structure is never frozen, but develops automatically through normal use to adapt to your needs. Stored information is automatically cross-indexed under any desired headings, and you may add or change headings at any time...just by typing pidgin English Requests.

WHATSIT*	\$125.95
MANUAL**	\$ 25.95

(for example, Accounts Receivable File) • Multiple address files selectable • Multiple letter files selectable • Full User Documentation with detailed instructions • Over 20 Commands for controlling report logic • Conditional prints can be included • Totals can be generated and printed • Name and Address Entry Program Included to create your own files.

### SOFTWARE PACKAGE-LETTER WRITER PACKAGE

LWP*	\$ 99.95
MANUAL**	\$ 15.95

## 6809 BASED SYSTEM ON THE S-100 BUS



The **SYSTEMS 8 and 9** from MicroDaSys bring the powerful 6809 processor with its 16-bit instructions and internal registers, extended addressing and hardware multiplication to the economical and popular S-100 bus. These systems combine tremendous value and unmatched state-of-the-art performance for turnkey applications.

The **SYSTEM 8** features the MicroDaSys custom console, keyboard, S-100 bus motherboard, 16 amp power supply, fan, 80 x 24 video/graphics card, and the MD-690b 6809 based CPU board. The system includes a 2400 baud cassette interface, 10K PROM space, 1K RAM, 20 I/O lines, an RS-232 interface and interrupt driven keyboard input. The MicroDaSys ColorMaster video card allows the addition of 8-color video generation as a system option.

The **SYSTEM 9** includes those features found in the **SYSTEM 8** and adds a 32K static RAM card populated with 8K of RAM chips. Adding memory to the **SYSTEM 9** is as easy as plugging memory chips on the 32K RAM card.

The **SYSTEM 9** is expandable to a complete disk-based system with the MicroDaSys Disk Operating System and full-sized disk drives. MicroDaSys has a complete software consulting staff to support the systems.

The **SYSTEMs** come with complete documentation and application notes. The **SYSTEMs** are also assembled and tested

### ASSEMBLED AND TESTED

<b>SYS8C</b> .....	<b>\$798.95</b>
<b>SYS8K</b> .....	<b>\$648.95</b>
<b>KIT</b>	
<b>SYS9K</b> .....	<b>\$798.95</b>
<b>6809 ASSEMBLER AND TESTED</b>	
<b>SYS8C</b> .....	<b>\$798.95</b>
<b>EACH 8K ADDITIONAL RAM</b>	
<b>S4S9C</b> .....	<b>\$998.95</b>
<b>EACH 8K ADDITIONAL RAM</b>	
<b>SYS8K</b> .....	<b>\$129.95</b>

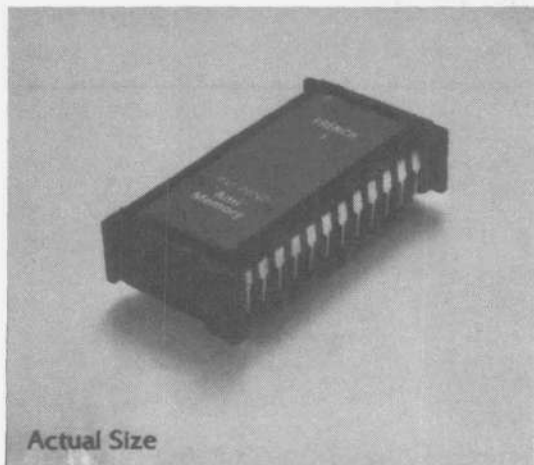
## MISCELLANEOUS

### THE CRAIG M100 TRANSLATOR

An instant translator of words and phrases from the world's major language: English, Spanish, French, German, Italian, Japanese. • A personal interpreter when you travel. • A valuable learning aid when you study. • A spelling and phonetic pronunciation guide. • A quick phrase guide equivalent to the most popular phrases. • A calculator and metric converter. • Stores approximately 5,000 words and phrases. • References three languages at once.

TRANSLATOR MOD. M100

**CRAA12086** ..... **\$199.95**



Actual Size

### CRAIG MEMORY CAPSULES

The amazing versatility of the Craig M100 is made possible by the use of self-contained, interchangeable Memory Capsules. The M100 and the capsules use the AMI MEMORY SYSTEM (pat. pending). One capsule, containing Metric Conversion and Calculator Programming is permanently in place. The other positions are for three capsules of your choice. The languages now available are just the beginning. Additional subjects soon to be introduced including calorie counters, educational games, etc. It requires only a few seconds to switch capsules, allowing you to change your M100 from an English/French/Spanish translator to a 3-subject information center.

#### SPANISH CAPSULE

<b>CRAR22286</b> .....	<b>\$ 25.95</b>
<b>GERMAN</b>	
<b>CRAR22287</b> .....	<b>\$ 25.95</b>
<b>FRENCH</b>	
<b>CRAR22288</b> .....	<b>\$ 25.95</b>
<b>ITALIAN</b>	
<b>CRAR22336</b> .....	<b>\$ 25.95</b>



## ACCOUNTING SOFTWARE

With the SYSTEM-Z you can maintain exacting accounting records for your business. We offer General Ledger, Accounts Receivable, Accounts Payable, and Payroll. You have your choice of two different software systems. Level I is the best software package for the small business that has relatively simple accounting procedures. Level II is more comprehensive and has many additional options and features. The user manuals explain options in detail, contain sample data and sample runs and show the exact format of printouts used in each program.

## GENERAL LEDGER

GL1 Level I ..... \$ 139.95  
GL2 Level II ..... \$ 699.95

## ACCOUNTS RECEIVABLE

AR1 Level I ..... \$ 139.95  
AR2 Level II ..... \$ 699.95

## ACCOUNTS PAYABLE

AP1 Level I ..... \$ 139.95  
AP2 Level II ..... \$ 699.95

## PAYROLL

PR1 Level I ..... \$ 139.95  
PR2 Level II ..... \$ 699.95

## ALL FOUR PACKAGES

Level I ..... \$ 560.95  
Level II ..... \$2250.95

## COVER YOUR INVESTMENT

Beautifully and protect from dust and spills with durable, washable vinyl Available in Saddle Tan.

TRS80 KEYBOARD

2447980K ..... \$ 7.95

CASSETTE

2447980C ..... \$ 3.95

PET

24479PET ..... \$19.95

SORCERER

24479SOR ..... \$ 9.95

APPLE II

24479AK ..... \$ 9.95

VIDEO DISPLAY

244798VD ..... \$ 9.95\*

COMPLETE SET

2447980C ..... \$19.95\*

APPLE II DISK

24479AD ..... \$ 3.95

TRS80 DISK

2447980D ..... \$ 3.95

\*With expansion interface add \$3.95

## DIGITIZER

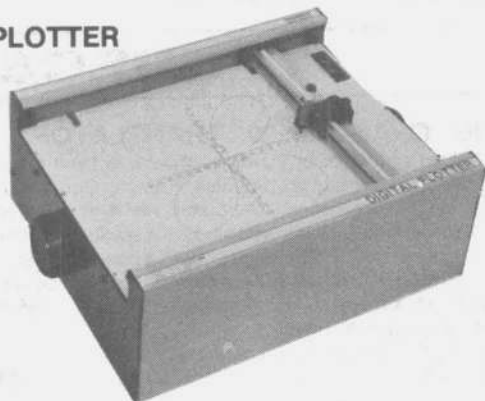


RS-232C or parallel active surface 11 inch by 11 inch.  
Relocatable origin inch/metric selectable.

HI PAD

HOUA32085 ..... \$699.95

## XY PLOTTER



RS-232C and parallel interface plot sizes 7" x 10", 4800 BAUD,  
200 increments per inch.

HI PLOT

HIPT1000 ..... \$1085.95



PET

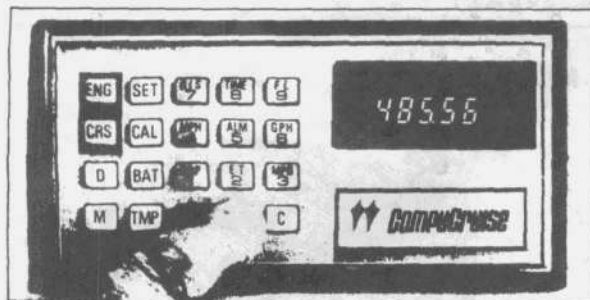


APPLE II



TRS-80

## COMPUCRUISE



Put a computer in your car, which gives you the most effective and functional cruise control ever designed, plus complete trip computing, fuel management systems, and a remarkable accurate quartz crystal time system. So simple a child can operate, the new CompuCruise combines latest computer technology with state-of-the-art reliability in a package which will not likely be available on new cars for years to come • Cruise Control • Time, E.T., Lap Timers, Alarm • Time, Distance, Fuel to Arrival • Time, Distance, Fuel to Empty • Time, Distance and Fuel on Trip • Current or Average MPG, GPH • Fuel Used, Distance since Fillup • Current and Average-Vehicle Speed • Inside, Outside or Coolant Temperature • Battery Voltage • English or Metric Display.

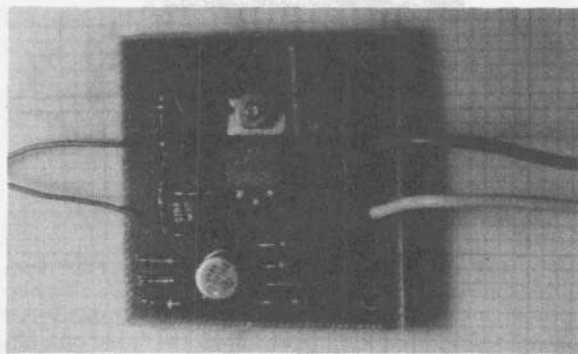
**CC3710C** ..... \$169.95  
 WITHOUT CRUISE CONTROL  
**CC3710WC** ..... \$129.95

## DISK ACCESS SUPERVISER

Allows you to directly manipulate information on the disk, read a sector, change it and rewrite it back to disk. You can list to printer and to the video screen. Also tell you how many free sectors. It will list in either dump or disassembly mode.

ON CASSETTE  
**ADF0133C** ..... \$14.95  
 ON DISKETTE  
**ADF0133D** ..... \$19.95

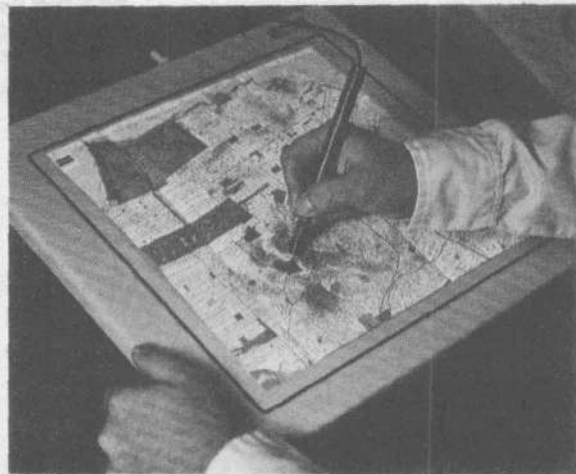
## THE SWITCH



**OPTO ISOLATED 120 VAC SOLID STATE SWITCH** • Input 5 VDC 2 mA (TTL) • Isolation 1500 VDC • Output 6 A 120 VAC 720 W • Size 2 x 2 • 1 channel • Size 2 x 8 4 channel.

1 CH KIT  
**79000K** ..... \$ 9.95  
 4 CH KIT  
**79004K** ..... \$ 34.95  
 1 CH ASSEMBLED AND TESTED UNIT  
**79000A** ..... \$ 12.50  
 4 CH. ASSEMBLED AND TESTED UNIT  
**79004A** ..... \$ 44.95

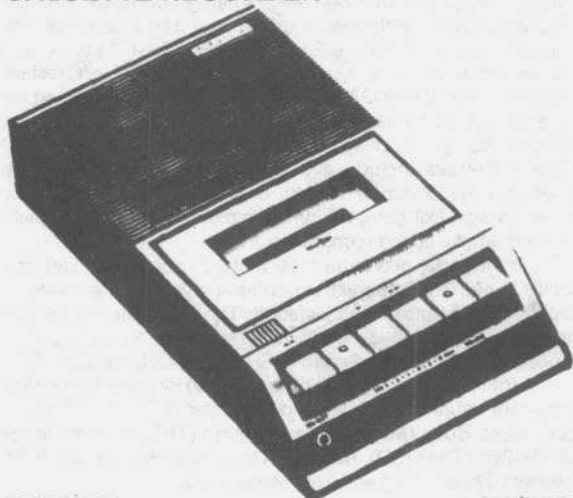
## DIGI-KIT-IZER



**di-i-kit-izer/dij-e-kit-izer/n:** (1) a high-value low-cost computer graphic input device designed to be assembled by the user; (2) The most advanced graphics tablet in kit form; (3) An instrument that, when assembled, allows the user innumerable methods of design and analysis function; (4) The latest addition to the most extensive, accurate and reliable line of digitizers, by Talos. No adjustments. No calibration. **OPTIONS:** APPLE Interface, TRS-80 Interface, RS-232 Interface, Power Supply, Super Graphics Software.

**DIGITIZER**  
**DIG1100** ..... \$499.95  
 15 VDC POWER SUPPLY  
**TAL101** ..... \$ 89.95  
 APPLE INTERFACE  
**TAL102** ..... \$ 95.95  
 RS-232 INTERFACE  
**TAL103** ..... \$ 99.95  
 TRS-80 INTERFACE  
**TAL104** ..... \$125.95  
 SUPERGRAPHICS SOFTWARE (FOR APPLE)  
**TAL105** ..... \$ 49.95

## SONY SUPERSCOPE CASSETTE RECORDER



**SCPA30315** ..... \$89.95

# MODEMS

## GENERAL DATACOMM INDUSTRIES, INC.



The GDC 212A FCC-Registered microprocessor based modem operates full duplex at two distinct data rates directly connected to the switched network. In the high speed mode, the data rate is 1200 bps asynchronous or synchronous. In the low speed mode, operation is asynchronous up to 300 baud.

The GDC 212A modem may originate or answer a call and may be operated in an attendant-free auto answer mode. Speed selection is determined by the originating GDC 212A, either by a switch or by an EIA interface control signal. This allows the modem to call another GDC 212A, a Western Electric 212A or a 103/113 series modem.

Field selectable strap options are provided on the GDC 212A to select either the synchronous or asynchronous data format at 1200 bps or 0-300 bps asynchronous operation plus a broad range of other operating configurations.

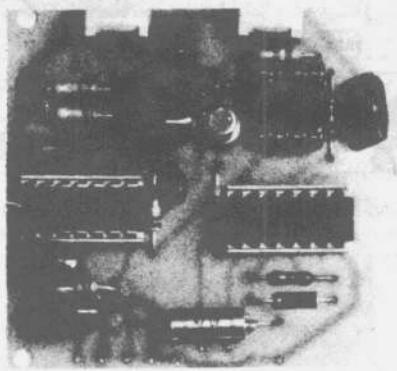
Standard features of the GDC 212A include local and remote signal loopback diagnostics and test modes, speed selection and indication and a variety of options which include manual or automatic call answering. Standard diagnostics are: Analog Loopback with Self-Test, Analog Loopback, Remote Digital Loopback with or without Self-Test (High-Speed Mode), Digital Loopback Test and End-to-End Self-Test. A built-in test pattern generator/recognizer circuit permits end-to-end testing between two GDC 212A modems and eliminates the need for special test equipment. An economical full duplex 1200 bps modem designed for switched network operation, the GDC 212A's features include a direct connect capability to the switched telecommunications network, a microprocessor based design, Bell compatibility, a complete diagnostic capability and automatic speed recognition.

Front panel pushbutton switches in conjunction with the unit's built-in test capabilities permit analysis of the modems operation and rapid fault isolation. The pushbutton switches are: Analog Loopback (AL), Self-Test (ST), Remote Digital Loopback (RDL), High Speed (HS) and Digital Loopback (DL).

Front panel light emitting diode (LED) indicators provide a constant visual check of the modem's status. These indicators are: Make Busy (MB), Terminal Ready (TR), Modem Ready (MR), Send Data (SD), Received Data (RD), High Speed (HS), Modem Check (MC) and Test Mode (TM).

**GDC212A** ..... **\$569.95**

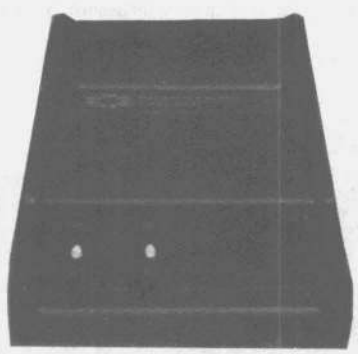
## MODEM TYPE 103



This circuit uses the XR-2211 FSK demodulator. The XR-2211 is a monolithic phase-locked loop system designed for data communications. This circuit connects to a crystal mike for an input and an eight ohm speaker for an output. Only a single supply of +5 volts is required. The data inputs and outputs are TTL. The circuit works up to 300 baud.

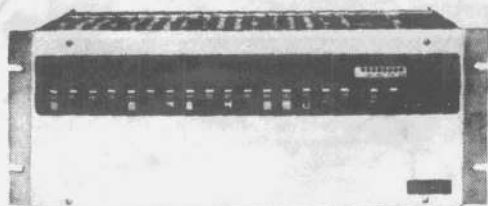
**KIT**  
**109A** ..... **\$ 29.95**

## NOVATION MODEM



**Data Rate:** 1200 Baud on unconditioned telephone lines.  
**Operating Mode:** Automatic Answer, DDD, Dedicated 2/4 wire, Leased Line, Manual Initiate, DDD. **Communication Mode:** Half duplex or Simplex on 2-wire leased lines. Full duplex on 4-wire leased lines. Half duplex or Simplex on DDD (only). **Phone Line Interface:** 2-wire leased line, 4-wire leased line: Direct connect per FCC Part 68. Modular plug mates with standard telephone Modular Jack (USOC-RJ11C). FCC registration #: AU492X-70157-PC-N. Ringer equivalence: 0.3A, 1.0B. **Bell Compatibility:** 202C, D, E, R, S, T. **Frequencies:** Mark: 1200 Hz (+.5%). **Auto Answer:** Tone 2025 Hz (+-1%), Internal switch option: Abort timer 6 sec, 18 sec., Force DTR Available.

**4202** ..... **\$549.95**  
**4202B** ..... **\$549.95**



**TECHNICAL SPECIFICATIONS  
(DEPENDENT UPON TYPE OF  
BOARD ORDERED)**



Check These Major User Benefits • Triple modem (VA3400, 212A and 103) • Built-in microprocessor—no custom LSI • Terminal interface transparent to actual mode used • One phone number for all asynchronous ports • Dial-in disciplines unchanged • Continuous self-test • Full user diagnostics (analog and digital loopback) • Four models to choose from.

Like the Chameleon, Racal-Vadic's Triple Modem Changes Automatically. Like the chameleon that changes color, Racal-Vadic's Triple modem, specifically designed for central computer sites, automatically changes in to Racal-Vadic VA3400, a Bell 212A, or a Bell 103, depending on which remote modem is calling.

Built-in Microprocessor. A microprocessor uniquely accomplishes this, with an automatic recognition sequence that identifies the calling modem without disturbing normal connect protocols.

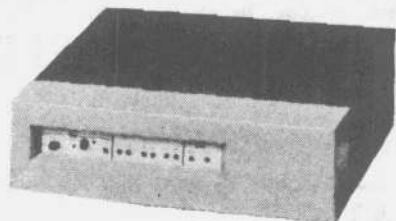
Terminal interface operation is completely transparent to modem type, so that computers capable of using the VA3400, the 212A or the 103 can install Racal-Vadic's Triple modem without altering hardware or software in any way. Computer service operators will not have to retrain users on proper dial-up disciplines. With Racal-Vadic's Triple modem, central computer sites can handle any mix with a single modem type, regardless of the terminals and modems at remote locations.

**RAVD3467** ..... \$1049.95

• Data Rate: 0 to 1200 BPS, Operating Mode: Half Duplex—1200 bps, or half/full 300 bps version • Data Interface: EIA RS-232C • Power Input: 115 Vac, 60 Hz, 5 Va. • W.E. Compatible: 202C9, 202C10, 2025, or 103.

- ACOUSTIC COUPLER** —(300 bps) ANSERR
- AC312** ..... \$199.95  
(300 bps) ORIGINATE
- AC3122** ..... \$199.95  
(300 bps) ANSWER/ORIGINATE
- AC3123** ..... \$219.95  
(1200 bps) BELL 202 HALF DUPLEX COMPATIBLE
- AC3124** ..... \$459.95  
(300 bps) ANSWER-PRINTED CIRCUIT BOARD ONLY
- AC3125** ..... \$139.95  
(300 bps) ORIGINATE-PRINTED CIRCUIT BOARD ONLY
- AC3126** ..... \$139.95  
(300 bps) ANSWER/ORIGINATE-PRINTED CIRCUIT BOARD ONLY
- AC3127** ..... \$179.95  
(1200 bps) PRINTED CIRCUIT BOARD ONLY
- AC3128** ..... \$339.95

**GENERAL DATACOMM INDUSTRIES, INC.**



**COMPATIBLE WITH WECO 202C, D, E, R, S, T.**  
**DIAGNOSTIC CAPABILITIES** • ANALOOP® • Self-Test • Digital Loopback • Diagnostic Indicators • Auto Answer.

**AUXILIARY TELEPHONE 502 RTC.**

**APPLICATION NOTES** • 1200 bps, 2-Wire Half-Duplex Over Switched Network • FCC Registered • Stand Alone or Rack Mount • Optional 5 bps Reverse Channel.

**GDC202S/T** ..... \$559.95

**COMPATIBLE WITH WECO 103A, E., G, H, 113A, B.**

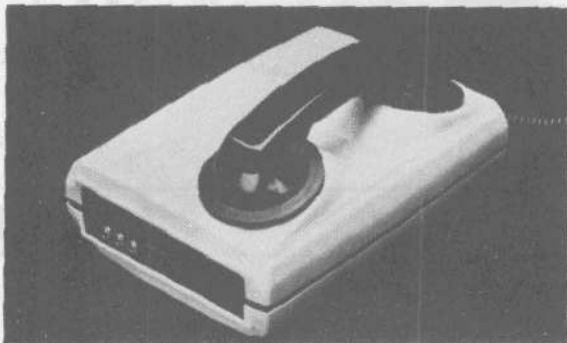
**DATA TERMINAL INTERFACE** EIA RS-232C.

**AUXILIARY TELEPHONE SET 500, 502, RTC.**

**APPLICATION NOTES** • Full-Duplex, 2-Wire • FCC Registered • Automatic Answer/Manual or Automatic Originate • Stand Alone Only.

**GDC103A** ..... \$419.95

**ACOUSTIC COUPLER/MODEM TC3001**



Originate only, 300 Baud asynchronous, Acoustic and DAA/private line interfaces, Half/full duplex

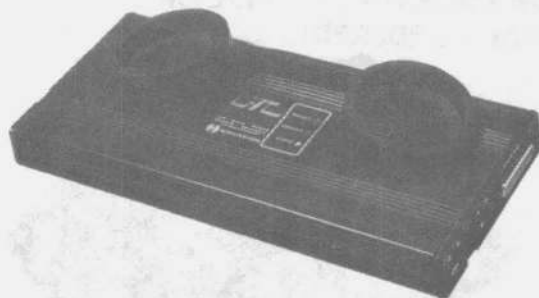
**TC3001** ..... \$239.95

**ACOUSTIC COUPLER/MODEM TC3002**

Is the same as Originate except: Originate and answer modes switch selectable, Simultaneous EIA and 20 mA interfaces, Power and carrier indicators, Pluggable printed circuit card.

**TC30002** ..... \$249.95

## NOVATION CAT



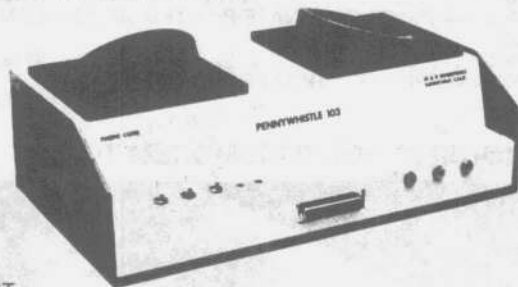
CAT Specifications: Data Rate: 0-300 Baud, Compatibility: Bell 103, Interface: EIA-RS232C, Modes: Answer, Originate, Test, Duplex: Half, Full, Indicators: Power, Carrier (Ready).

490190 ..... \$185.95

**Operating Mode:** 4102 Originate, 4103B Auto Answer/Manual Originate, 4113B Auto Answer Only. **Communication Mode:** Full, Half duplex. **Phone Line Interface:** Direct-connect per FCC Part 68. Modular plug mates with standard telephone Modular Jack (USOC-RJ11C). FCC registration No. AU492X-70157-PC-N. Ringer equivalence 0.3A, 1.0B. **Bell Compatibility:** 4102D 103A, 4103B 103A, 4113B 113B. **Data Rate:** 300 Baud. **Terminal Interface:** EIA RS232C/TTY

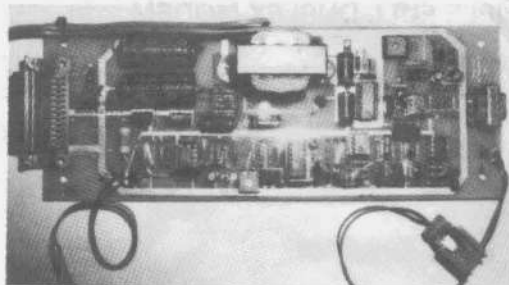
4102 ..... \$269.95  
4103B ..... \$379.95  
4113B ..... \$379.95

## PENNYWHISTLE 103



KIT  
P103K ..... \$129.95

## MODEM 2000

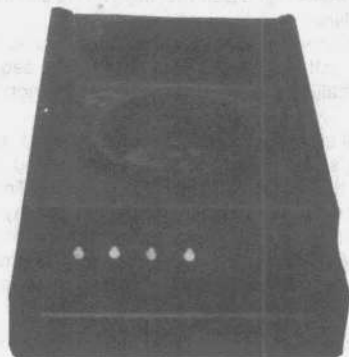


Originate, RS-232 and 20 mA compatible, Full duplex, and half duplex, direct connect or acoustic coupled, on board power supply, carrier detect light, DB25P plug, 300 BAUD, Type 103 compatible frequencies.

BARE BOARD

2000 ..... \$19.95  
KIT  
2000A ..... \$99.95

## NOVATION ACOUSTIC COUPLER



**Operating Mode:** 4102A Originate, 4103A Originate/Answer. **Communication Mode:** Full, Half duplex. **Phone Line Interface:** Acoustic coupling, Western Electric 500 type handset used in standard telephone set. **Bell Compatibility:** 103A. **Data Rate:** 300 Baud. **Terminal Interface:** EIA RS232C/TTY

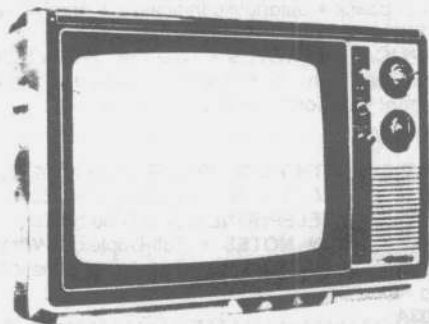
4102A ..... \$269.95  
4103A ..... \$379.95

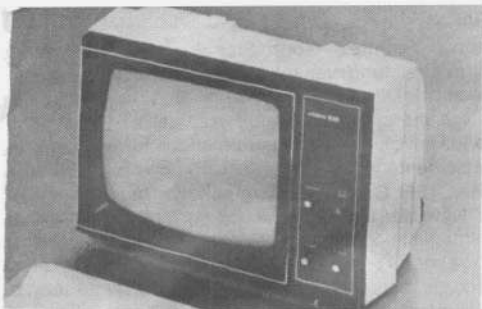
## MONITORS

VICCOM  
COLOR MONITOR/RECEIVER

Input Impedance: 75 ohms • Attractive simulated woodgrain cabinet • Power Requirements: 117VAC 50/60 HZ. • Combination computer monitor and TV receiver • Standard composite video inpt. • Video input electrically isolated from chassis and AC line. • 100% solid state circuitry • Resolution: 300-350 Pixels.

13 INCH  
TC700 ..... \$549.95  
19 INCH  
TC900 ..... \$675.95

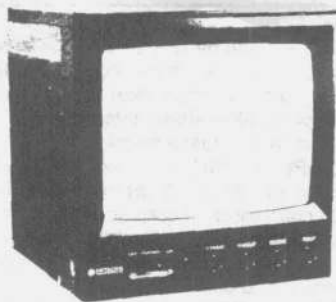




12" diagonal video monitor. composite video input. Solid-state circuitry for stable, sharp picture. Video bandwidth—12 MHz  $\pm$ 3 dB. Input impedance—75 ohms. Resolution—650 lines min. IN central 80% of CRT; 550 lines min. beyond central 80% of CRT, ref: EIA RS-375. dimensions—11.375" high, 16.250" wide, 11.250" deep (excluding video input connector). Weight—6.5 KG (14.3 lbs.) net.

**10TAMOT** ..... **\$139.95**

**HITACHI MONITOR**



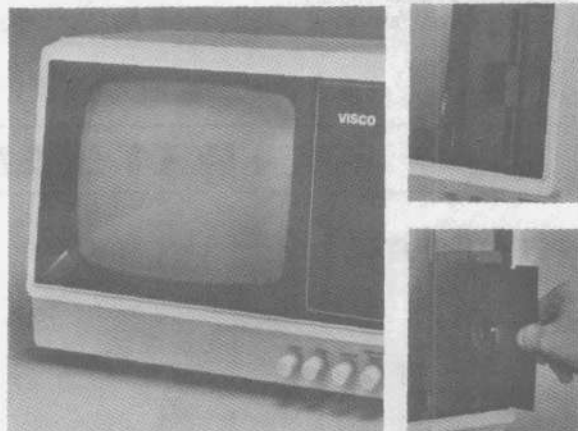
- 9 INCH MONITOR 500 LN  
**HITA30122** ..... **\$229.95**
- 12 INCH MONITOR 700LN  
**HITA30123** ..... **\$369.95**
- 17 INCH MONITOR 650LN  
**HITA30124** ..... **\$399.95**

**SANYO MONITOR**



15 INCH  
**SANA30851** ..... **\$289.95**

**VIDEO-100**



Power Requirements: 177 VAC 50/60 Hz. • Woodgrain cabinet • Combination computer monitor and TV receiver • Standard composite video input. • Video input electrically isolated from chassis and AC line. • 100% solid state circuitry • Resolution: 300-350 Pixels.

- 13 INCH  
**TC700** ..... **\$549.95**
- 19 INCH  
**TC900** ..... **\$675.95**

**NORTH STAR**

**HORIZON 32K RAM, UP TO FOUR MINI DISK DIRVES, 4 MHZ Z80A PROCESSOR, SERIAL AND PARALLEL I/O PORTS, AND EXTENDED BASIC:**



The HORIZON Computer is a complete, high-performance microcomputer system with integrated floppy disk memory. To begin programming in North Star extended disk BASIC, merely plug in a CRT or hardcopy terminal. Operating a HORIZON is simple; there is only an on/off switch and a restart button. The North Star software is automatically loaded from diskette within seconds after power-on.

- HORIZON II 32K D/DEN (ASSM) FULLY LOADED  
**NORA12144** ..... **\$2399.95**
- HORIZON II 16K D/DEN (ASSM) FULLY LOADED  
**NORA12145** ..... **\$2299.95**
- HORIZON I 32K D/DEN (ASSM) FULLY LOADED  
**NORA12142** ..... **\$2199.95**
- HORIZON I 16K D/DEN (ASSM) FULLY LOADED  
**NORA12143** ..... **\$1999.95**
- HORIZON II 32K D/SID D/DEN (ASSM) FULLY LOADED  
**NORA12337** ..... **\$2699.95**
- HORIZON I UPGRADE (KIT) I CUBLE DENSITY  
**NORK30592.D** ..... **\$3999.95**

## NORTH STAR PASCAL

Pascal, one of the most popular languages to embody the principles of structured programming, is available from North Star for use with the HORIZON and the MICRO-DISK SYSTEM.

**A complete System**—North Star Pascal is a complete program development system. Pascal source programs are prepared using the screen-oriented editor. They are compiled and linked into fast-executing P-code, and executed by a simulator for an "ideal" Pascal processor called the P-machine. At run-time, compiled P-code versions of Pascal programs execute about 10 times faster than equivalent programs under typical interpreter systems.

The Pascal system available from North Star is a special version of the popular "UCSD Pascal" implementation, developed at the Institute for Information Systems at the University of California, San Diego. The language implemented is based on the Standard Pascal language.

North Star Pascal runs under its own disk operating

system, and does not use the North Star DOS. However, Pascal programs may access and manipulate disk files created under DOS or BASIC.

**Advanced Features**—North Star Pascal features block control structure, long variable names, formatted numeric output, local variables in procedures and functions, and provision for pre-compiled library routines. The language includes a full set of operators and functions for manipulating data of the elementary data types REAL, INTEGER, BOOLEAN, and CHARACTER. Complete string-handling facilities are also provided. New data types may be defined by the programmer for special applications. Extensive data-structuring facilities in the language permit organization of data into multi-dimensional arrays, records, sets, or files. Data files on diskette may be accessed sequentially or in random fashion. The availability of special pointer variables in North Star Pascal promotes convenient manipulation of complex dynamic data structures such as trees and lists.

**NORD51998** ..... \$ 48.95

## PET HARDWARE

### PET COMPUTER



Dimensions: 16 1/2" wide by 18 1/2" deep, 14" overall height. Weight: 44 lbs. MEMORY: Random Access Memory 16 or 32K bytes. Read Only Memory (operating system resident in the computer): 14K bytes; 8K+—Basic interpreter; 4K—Operating System; 1K—Machine language monitor.

**VIDEO DISPLAY UNIT:** 9" monochrome CRT; 1000 character display, 40 x 25; 8 x 8 dot matrix for characters; 64 standard ASCII characters; 64 graphic characters.

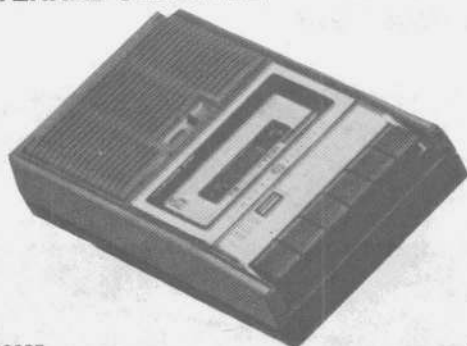
**KEYBOARD:** Business or Number Pad Version; Screen Control: home, clear, up, down, left and right; Editing: Character insertion and deletion.

**OPERATING SYSTEM** will support multiple languages (BASIC resident). Machine language accessibility. File management in operating system. Random number generation or pseudo random sequence.

**INPUT/OUTPUT:** I/O supported through IEEE-488 instrument interface for multiple intelligent peripherals. Memory mapped I/O user port. All I/O automatically managed by operating system software. Single character I/O with GET command.

**BASIC INTERPRETER:** Expanded 8K BASIC. Strings, integers and multiple dimension arrays. High precision (9 significant digits). Direct memory access through PEEK and POKE commands. Additional sockets are provided on board for 8K ROM expansion. ROMs for assembler or disk O.S. may be inserted.

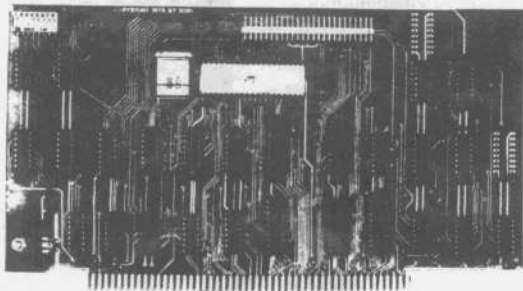
### EXTERNAL CASSETTE



8K—GRAPHICS	
KYBD2001868 .....	\$ 696.95
8K—BUS	
KYBD200181 .....	\$ 666.95
16K—GRAPHICS	
KYBD20011613 .....	\$ 796.95
16K—BUS.	
KYBD20011612 .....	\$ 796.95
32K—GRAPHICS	
KYBD20013214 .....	\$ 999.95
32K—BUS	
KYBD20013215 .....	\$ 999.95

**24000035** ..... \$95.95

## PET TO S-100 BUS ADAPTER



The S-100 MPS (Memory and Peripherals Adapter) allows a Commodore PET 2001\* computer to be interfaced to the popular S-100 Bus for memory expansion and extended I/O capabilities. The S-100MPA is an S-100 sized board that plugs into any suitable, user supplied mainframe (motherboard, chassis and power supply) and a cable then connects to the memory expansion connector on the PET. It's that simple to install.

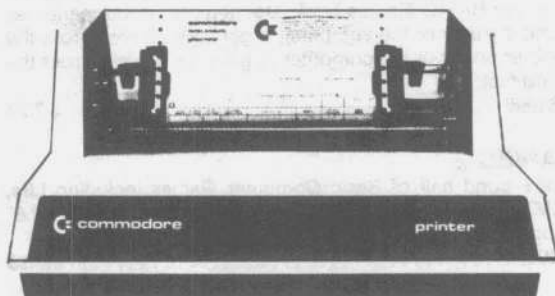
The S-100MPA is not a "bare bones" emulation of the S-100 Bus. In fact, the S-100 MPA meets or exceeds most of the proposed IEEE S-100 Bus Standards. This means you get total compatibility with almost every S-100 Bus peripheral available.

The S-100 MPA is the only one that gives you full DMA in accordance with the S-100 Bus protocol. This means you can use a Dazzler from Cromemco. Or just about anything!

**The S-100 MPA CAN ALSO BE A STAND-ALONE CPU!** An important feature of the S-100 MPA is it's ability to become a stand-alone 6502 processor board for the S-100 Bus. This makes it the only 6502 processor—S-100CPU board that truly emulates the complete S-100 Bus. Just order the Stand Alone Option and the extra parts just plug right in.

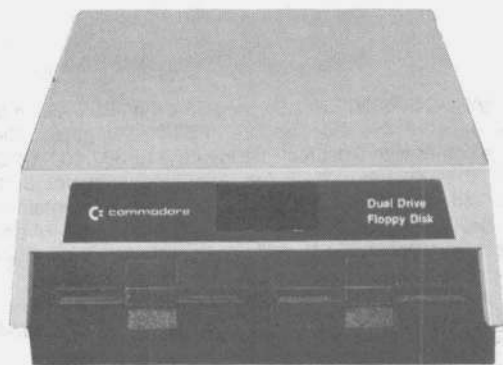
**S100MPA** ..... \$269.95  
**WITH STAND ALONE OPTION**  
**S100MPAO** ..... \$319.95

## TRACTOR FEED PRINTER



**Microcomputer System Devices**—6504 Microprocessor; 6532 I/O, RAM, interval timer (2); 6332 4K x 8 ROM. **Printer Mechanism**—Manufactured by Epson, Model 3110; Tractor feed/Programmable spacing (6,8 Lines Per Inch); Epson DH-70 print head; Dot matrix—7 x 6—80 columns per line; Impact print—original plus 3 copies; Print rate is 70 LPM: 150 CPS (burst speed); Forms: Uses standard 80 column forms (tears down to 8 1/2 x 11); Variable form handling up to 10 inches.

## DUAL FLOPPY DISK



**Microcomputer system devices:** Controller—6504 microprocessor; 6503 I/O, RAM, and 1K ROM software; 6316 2K ROM for encoding and decoding disk data; 6522 I/O and interval timers. File interface—6502 microprocessor; (2) 6532 RAM, I/O, interval timers; (2) 6332 4K ROM each (total 8K disk operating system) Shared RAM; (8) 6114 1K x 4 bit static RAM (total 4K bytes).

**Disk drives:** (2) Shugart Associates SA390 drives standard minifloppy (5 1/2" disk) activity LED's light when a file is open on that drive.

**Power requirements:** 50 watts @ 120, 220 or 240 volts—50 or 60 Hz line frequency independent other line voltage options to be announced.

**Diskette organization:** Drive will format any soft sectored mini floppy diskette; 35 concentric tracks—constant density recording on each track varying number of sectors per track—innermost: 17 and outermost: 21; 176640 bytes on a single side; Track 18 used for directory; 170180 bytes for user storage; Soft-sectored; Diskettes for dual side recording may be used.

**204016** ..... \$999.95

**Packaging**—18 gauge all steel cabinet; Dimensions width—17.0, depth—14.0, height—8.15; Forms enter from rear or bottom of cabinet. **Data Interface**—IEEE-488; Standard 24-pin stacking connector; Device #4-7 by jumper option; Listener only; Recognizes secondary addressing. **Character Set**—Upper case ASCII: Lower case ASCII: CBM™ graphics. **Control Characters**—Enhance printing (doubles size) • Enable automatic line count and paging • Page eject • Print reverse field • Overprint a line • Switch to graphics character set • Switch to lower case character set • Print programmable character. **IEEE Secondary Address Commands**—Print data exactly as received • Accept characters as a format • Edit data to format • Alter number of lines per page • Enable diagnostic messages to print • Accept data for programmable character • Programmable line spacing (permits continuous vertical printing). **Data Formatting Capability**—Field width and decimal position specified • Leading or trailing sign • Fixed or floating dollar sign • Forced leading zeroes • Literal characters always printed • Alpha fields left justified. **Diagnostic Messages**—Can be turned on when desired • Print on paper • Describe problems with format and data. **2023 Specifications:** Has all of the above features except: • Friction feed rather than tractor feed • Fixed line spacing rather than programmable • Dimensions: width—17.0, depth—14.0, height—8.15.

**202218** ..... \$796.95  
**202313** ..... \$699.95

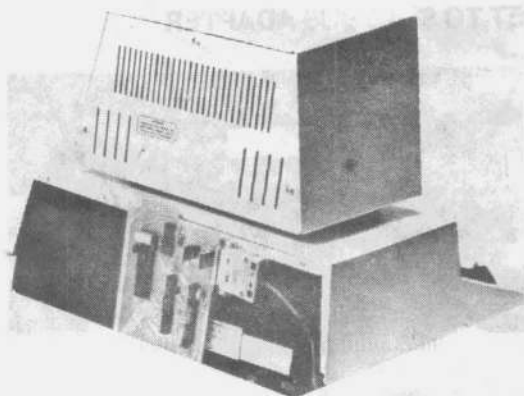


## HARDCOPY INTERFACE

**GPA's HARDCOPY INTERFACE** plugs into the "IEEE-488" bus on the back of the Commodore "PET" Computer. The interface comes with Selectable baud rate (110, 300, 600, 1200, 2400, 4800, 9600) and a DB-25 female printer connector. Both RS-232C and 20 mA. current loop compatibility are contained in one. Best of all you still retain the "IEEE-488" bus. GPA has provided you with an "IEEE-488" edge connector, that allows you to extend the bus for additional devices.

ASSEMBLED AND TESTED

GRAPET1003 ..... \$ 79.95




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## PET SOFTWARE

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### PET (8K) SOFTWARE

#### ASTROLOGY PROGRAM

By Michael Erlewine (P.S)

Astrologers must ordinarily go through many tedious calculations so determine the exact position of the stars and planets at the time of birth. This program does all of the work for you. Enter the year, month, day and exact time of birth, along with the geographic latitude and longitude and the time zone of the place of birth. The program then goes on to calculate all information needed to determine a natal horoscope. This program is loaded with celestial mechanics equations.

PET VERSION 8K

P2H103 ..... \$14.95

#### SPORTS GAMES-2

(C.C.S)

(7 Games). **KITE FLIGHT**—cut the string of your opponents kite. **SPLAT** is a parachute jump game. **CAR RACE**—zoom around the course. **BREAKOUT**—knock bricks off the wall. **BOWLING**—a day at the lanes. **FOOTBALL**—you're the quarterback. Shoot baskets in **Basketball**.

PET VERSION 8K

P2G139 ..... \$ 7.95

#### SENSATIONAL SIMULATIONS-1

(C.C.S)

Five super simulations including the popular **ANIMAL** in which the computer learns animals from you. **FUR TRADER** lets you trade furs in old Canada. **HAMMURABI** in which you manage the city-state of Sumeria. Or try making your fortune in the **STOCK MARKET**. A logic game. **WORD**, has you guess secret words.

PET VERSION 8K

P2G133 ..... \$ 7.95

#### PET GRAPHICS

By Dan Fylstra (P.S)

There are four programs in this package: **DOODLER**, **PLOTTER**, **BARPLOT** and **LETTER**. **DOODLER** lets you draw pictures on the PET screen with a minimum of effort, which later can be saved on cassette or converted into a series of basic print statements for incorporation in a larger program. **PLOTTER** plots curves given a function and a variable. **BARPLOT** can be used to plot bargraphs and **LETTER** formats large graphic letter and numerals on your PET's screen.

PET VERSION 8K

P24109 ..... \$14.95

#### BASIC FINANCE/INVESTMENT ANALYSIS PACKAGE

With this package of programs your PET can assist you in making investment decisions involving the interaction of time and money. This includes-calendar, loan and saving calculations along with depreciation analysis.

321013 ..... \$24.95

#### CP/M SOFTWARE GAMES-1

An 8" floppy disc containing most of the first fifty games from Basic Computer Games in Microsoft Basic. All the games from **Acey Ducey** to **Hi-Q** including such favorites as **Animal**, **Bullfight**, **Craps**, and **Hangman**. (To run this, you need CP/M and Microsoft Basic).

CS9001 ..... \$17.95

#### GRAPHICS GAMES-2

Six favorite games. **LEM**, lunar lander with a graphic display and optional auto-pilot. **Nuclear Reaction**, a game of skill for two players. **Artillery**, in which two players shoot it out over computer-generated terrain. **Bounce** traces the path of a ball bouncing around the screen. **Checkers**, with graphic display, from our BASIC Games book. **Dodgem**, try to outmaneuver another player or the computer to get your pieces across the board first.

CS1005 ..... \$ 7.95

#### GAMES-2

The second half of Basic Computer Games including **Life**, **LEM**, **Mugwump**, **Stars**, **23 Matches**, **Word**, and forty more! 8" floppy disc.

CS9002 ..... \$17.95

#### EDUCATION SIMULATIONS-1

Five super simulations including the popular **Animal** in which the computer learns animals from you. **Fur Trader** lets you trade furs in old Canada. **Hammurabi** in which you manage the city-state of Sumeria. Or try making your fortune in the **Stock market**. A logic game. **Word**, has you guess secret words.

CS1201 ..... \$ 7.95

**GRAPHICS GAMES-1**

(C.C.S)  
 Five amazing realtime graphics games designed especially for your PET. In **CHASE**, one player pursues the other through a maze of obstacles and "zap doors." **ESCAPE**—attempt to escape from a prison patrolled by robot guards. **DART** provides arithmetic drill and indicates how close your response is to the correct answer on a dart board. In **SNOOPY** you compute distances on a number-line while trying to shoot down the Red Baron. In **SWEEP** you must try to hit nine targets in order by controlling the path of a cannonball.  
 PET VERSION 8K  
**P2G135** ..... \$ 7.95

**CONVERSATIONAL GAMES-1**

(C.C.S)  
 Talk to **ELIZA**, the computerized psychoanalysis program. Compose poetry with **HAIKU**. Challenge your vocabulary and word-guessing skills with **HANGMAN**. **HURKLE**, try to find the hurkle on the 10 by 10 grid in five moves. In **HEXLETTER**, you compete to capture more letters on a hexagon than your opponent.  
 PET VERSION 8K  
**P2G137** ..... \$ 7.95

**LOGIC GAMES—1**

(C.C.S)  
 Six favorites from BASIC Computer Games with super graphics. **AWARI**, the African logic game with 12 pits and 36 beans. **BAGELS**, which challenges you to guess a secret 3-digit number. Martin Gardner's **CHOMP** in which you chomp on a cookie with a poison corner. **FLIP-FLOP**—change a row of X's to O's. **HEXAPAWN** played with three chess pawns. **HI-Q**, a solitary peg-removal game.  
 PET VERSION 8K  
**P2G131** ..... \$ 7.95

**LOGIC GAMES-2**

(C.C.S)  
 Six challenging puzzles including **ROTATE**, in which you order a matrix of random letters. **STRIKE-9**, try to remove all nine digits without striking out. The classic number game, **NIM**. In **EVEN-WINS** try to take an even number of chips. **HI-LO**, a number guessing game with a jackpot. **BATNUM**, the super "battle of numbers!"  
 PET VERSION 8K  
**P2G134** ..... \$ 7.95

ALL PROGRAMS REQUIRE 8K OF RAM UNLESS OTHERWISE SPECIFIED.

**NUMBER GAMES-1**

(C.C.S)  
 Six number logic games including **GUESS** in which you guess a secret number. **23-MATCHES**—try not to take the last match. **LETTER** in which you guess a secret letter. **NUMBER, A RANDOM JACKPOT GAME**. **TRAP** in which you trap a mystery number between two trap numbers. **STARS** gives you stars as clues to the secret number.  
 PET VERSION 8K  
**P2G132** ..... \$ 7.95

**BASIC ASSEMBLER FOR THE PET (P.S.)**

Now you can write programs in assembly language for the 6502 microprocessor and have them translated to machine language for direct execution on your PET. The assembler accepts all standard 6502 instruction mnemonics, pseudo-ops and addressing modes plus a new TEXT pseudo-op and evaluates binary, decimal, hexadecimal and character constants, symbols and expressions. You can create assembly source programs with the text editor which is supplied and save them on cassette. The assembler reads its source code from cassette or from DATA statements and assembles machine code directly at any location in memory. You can save machine language subroutines in the PET's second cassette buffer and execute them immediately with the keyboard and display input/output.  
 PET VERSION 8K  
**P24108** ..... \$29.95

**RHYMING**

This program was designed to help teach the concept of rhyming words. The program is designed for use in the primary grades.  
**321110** ..... \$9.95

**ALPHABETIZING**

This program was designed to help teach the concept of alphabetizing. The program is designed for use in the primary grades  
**321111** ..... \$ 9.95

**PULLEY SYSTEMS**

These two programs deal with the analysis of a simple machine: a pulley system consisting of single, double or triple fixed and movable blocks. The concepts of work and efficiency are reviewed. **321207** ..... \$19.95

**GUESS A SENTENCE**

This series of programs was designed to help teach the concept of identifying complete sentences. The programs are designed for use in the primary grades.  
**321112** ..... \$29.95

**THE MOLE CONCEPT**

These two programs review the mole concept and the writing of chemical formulas.  
**321224** ..... \$19.95

**BASIC MATH PACKAGE**

This comprehensive package turns your PET into an efficient interactive calculator capable of solving many common mathematical problems. This includes matrix math routines, vector arithmetic, trigonometry, and numerical integration and differentiation.  
**321014** ..... \$29.95

**PROJECTILE MOTION**

These two programs review the basic definitions of Kinematics by dealing with the analysis of projectile motion.  
**321202** ..... \$19.95

**THE PET SHOW**

We have put together four demo programs especially designed to spotlight you PET's stellar qualities. This includes-Demo, Mandala, Graphics and World Clock.  
**321015** ..... \$9.95

**SPELLING**

This program was designed to help teach a student to spell words identified by the student.  
**321113** ..... \$9.95

**STATISTICS PACKAGE**

This package can assist you in the analysis of data. The four programs include general statistics, T-tests, correlation and regression, and chi square.

321020 ..... \$29.95

**REALTY FINANCIAL ANALYSIS**

For professional Real Estate investors and Brokers. Includes installment sales, cash flow, property operations and analysis.

321022 ..... \$59.95

**CROSSBOW**

Features a target game that, besides offering hours of fun, teaches fractions in an exciting and competitive environment. Three levels of play.

02701 ..... \$ 9.95

**CHECKBOOK**

This program provides an easy, error free method for keeping track of your checking account.

321021 ..... \$24.95

**MOLARITY CONCEPT**

These two programs deal with the concept of molarity.

321225 ..... \$19.95

**NAMING COMPOUNDS DRILLS**

These two programs give the student practice in writing the names of chemical compounds given the formula.

321238 ..... \$19.95

**STOICHIOMETRY: GENERAL**

These two programs involve mass/mass, mass/volume or volume/volume relationships in chemical reactions.

321231 ..... \$19.95

**MOMENTUM AND ENERGY**

These two programs deal with the concepts of linear momentum, impulse, kinetic energy and work.

321203 ..... \$19.95

**WRITE-TO-READ-LESSONS**

This series of programs contains 66 lessons designed to supplement a reading program in teaching students basic word attack skills necessary to reading. The programs are designed for use in the primary grades.

321100 ..... \$39.95

**MAYDAY**

Features an exciting and fast-moving airplane flight simulation. It takes concentration, judgment, and agility to avoid crashing!

02601 ..... \$ 9.95

**SERIES/PARALLEL CIRCUIT ANALYSIS**

These two programs deal with the analysis of a circuit in which a single resistor, R1, is in series with a parallel combination of resistors, R2 and R3.

321221 ..... \$19.95

**THE STATES AND THE CAPITALS**

These two programs were designed to teach the names, spelling and locations of the fifty states and their capitals. Excellent use of PET graphics are demonstrated by these programs.

321114 ..... \$14.95

**LENSES AND MIRRORS**

These two programs deal with the image forming properties of convex mirrors and lenses.

321217 ..... \$19.95

**FORMULAS OF COMPOUNDS DRILLS**

These two programs give the student practice in writing formulas of chemical compounds whose names are given.

321239 ..... \$19.95

ALL PROGRAMS REQUIRE 8K OF RAM UNLESS OTHERWISE SPECIFIED.

**SPACETREK**

This is the PET version of the familiar game many computer enthusiasts know as "startrek".

321011 ..... \$9.95

**DIET PLANNER AND BIORHYTHM**

**Diet Planner** (By Le Palank)-Determines the ideal weight for your height, your age, sex and body frame. Should you wish to lose weight, your PET will display the caloric intake required for you to reach your goal. **Biorhythm**-will indicate your intellectual, emotional and physical cycles according to a well regarded series of computations based on behavior.

321002 ..... \$14.95

**A TREASURE TROVE OF GAMES**

**Lunar Lander**-You just make the Lunar Excursion Module land softly on the moon. **Rotate**-is a puzzle on a 4 by 4 grid. The secret is to arrange the letters in sequence in as few moves as possible. Very tough at first. But it can be done. **Wumpus**-Clues are all given and you must find the Wumpus, on the basis of these clues, and get him before he gets you. **Tic Tac Toe**-See if you can beat your PET at this old reliable game.

321004 ..... \$ 9.95

**BASIC BASIC**

(By Ralph James and Ron Lodewyck)

A real tutorial program, introducing you to the BASIC language. You proceed at your own pace and can actually learn PET's BASIC in several hours and then begin your own programming. Uses just 4K of RAM memory.

321005 ..... \$14.95

**MACHINE LANGUAGE MONITOR**

This program enables you to program your PET in Machine language.

321000 ..... \$ 9.95

**BLACKJACK**

Place your bet and watch your PET deal out the cards as you to beat the house.

321009 ..... \$ 9.95

**GALAXY GAMES**

(Pete Ruetz)

You're required to maneuver your space ship while firing at the enemy, and at the same time, avoid hitting a star.

321006 ..... \$9.95

**TARGET PONG AND OFF THE WALL**

**Target Pong.** Insert paddles in the path of a fast moving ball to deflect the ball into a target. The secret is to use the fewest number of paddles and the least time to hit the target just once. It's really much more difficult than it sounds. It requires dexterity and guarantees you fun. **Off the Wall** is exactly the opposite.

321003 ..... \$ 9.95

**DRAW POKER**

You play Draw Poker against the house with two pair or better to win.

321008 ..... \$9.95

**SPACEFIGHT**

(By Leonard K. Sweatman)

Fire missiles at each other in this two player game.

321010 ..... \$ 9.95

**REVERSAL AND NUMBER REVERSE**

**Reversal**—is Commodore's version of Othello a game of strategy played on a 8 x 8 board, much like chess or checkers board. **Number Reverse**—is another game to tax your intelligence and logic.

321001 ..... \$ 9.95

**STOCK PORTFOLIO ANALYSIS PACKAGE**

With this package your PET can keep track of your stock portfolio and provide you with instant analysis of its current value and rate of return.

321012 ..... \$24.95

**MORTGAGE**

Almost a misnomer, because this program is suitable not only for people considering buying or selling property but also for anyone contemplating borrowing or lending money.

321007 ..... \$14.95

**DIGITAL CLOCK**

**Digital Clock** Why pay more for a digital clock? With your PET and the Digital Clock program, you can turn your computer into an extremely accurate timepiece that you can use to display local time in different zones—even split times for up to nine different zones! The list of uses is endless. It can time sporting events, be used as a darkroom timer, and will produce the most accurate 3 minute eggs that you've ever seen! And just wait till you take it out at next year's New Year's Eve party!

**Moving Sign** Let the world know what's on your mind. The Moving Sign program turns your PET into a slashing graphic display that will put your message across. Perfect for use in stores, offices, and homes, Moving Sign provides a means of attracting attention for advertising, displaying a warning message, or letting that certain someone know how you feel.

0083P ..... \$ 7.95

**TREK-X**

**TREK-X** Command the Enterprise as you scour the quadrant for enemy warships. This package not only has superb graphics, but also includes programming for optional sound effects. A one-player game for the PET 8K.

0032P ..... \$ 7.95

**BASEBALL MANAGER**

This pair of programs will let you keep statistics on each of your players. Obtain batting, on-base, and fielding averages at the touch of a finger. Data can be easily stored on cassette tape for later comparison.

NEEDS A PET 8K

0062P ..... \$14.95

**ARCADE I**

**Kite Fight**—In many parts of the world, kite flying is more than many just a way to while away idle time—it has evolved into a serious sport and is the object of fierce competition. Thanks to Instant Software, you and a friend can enjoy the exciting sport of kite fighting, rain or shine, in the comfort of your own home. Your PET will display two kites. Your mission is to maneuver your kites to encircle your opponent's line, thereby taking control of his kite, all the time using but one control: the computer equivalent of your hand on the string.

**Pinball**—Realistic? You bet! This program makes better use of your PET's exceptional graphic capabilities than any program we've seen to date. Bumpers, gates, flippers—they're all there. The program even includes sound effects to add that extra touch of realism. Loads of fun for everyone.

0074P ..... \$ 7.95

**ARCADE II**

Take one challenging memory game and two fast-paced action games, add a dash of interesting graphics, mix in some sound effects, and what have you got? Arcade II—and a whole lot of fun!

**UFO**—Somewhere, the UFO is falling toward Earth. It will only be visible momentarily, so you'd better keep your eyes on the screen. When you do see it, try to remember its exact location. Get the coordinates right, and you may save the world. Get them wrong and...well, at least you'll go smiling!

**Blockade**—In this two-player game of strategy and fast reflexes, you and your opponent struggle to stay clear of each other while building walls in an attempt to trap or force each other out of bounds. A great program for those rainy afternoons.

**Hit**—Better than a skeet shoot! How many times can you hit a stationary target in the center of your screen within the span of 90 seconds? Before you answer, you should know that although the target isn't moving you are—and quickly!

0045P ..... \$ 7.95

**MORTGAGE WITH PREPAYMENT OPTION AND FINANCIER**

These two programs will more than pay for themselves if you mortgage a home or make investments: • **Mortgage with Prepayment Options**—Calculate mortgage payment schedules and save money with prepayments. • **Financier**—Calculate which investment will pay you the most, figure annual depreciation, and compute the cost of borrowing, easily and quickly. All you need to become a financial wizard with an 8K PET.

0006P ..... \$ 7.95

**DOW JONES**

**DOW JONES** Up to six players can enjoy this exciting stock market game. You can buy and sell stock in response to changing market conditions. Get a taste of what playing the market is all about. Requires a PET with 8K.

0026P ..... \$ 7.95

## CASINO I

This craps program is so good, it's the next best thing to being in Las Vegas or Atlantic City. It will not only play the game with you, but also will teach you how to play the odds and make the best bets. A one player game.

REQUIRES PET 8K

0015P ..... \$ 7.95

## CASINO II

These two programs are so good, you can use them to check out and debug your own gambling system! • **Roulette**—Pick your number and place your bet with the computer version of this casino game. For one player. • **Blackjack**—Try out this version of the popular card game before you go out and risk your money on your own "surefire" system. For one player.

REQUIRES PET WITH 8K

0014P ..... \$ 7.95

## TURF AND TARGET



On the ground or in the air, this computerized collection of popular pastimes is sure to entertain. • **Quarterback**—You're the quarterback in this simulation. In order to get the ball over the goal line, you'll have to decide whether to pass, punt, hand off, or make the break and run it through. Your PET will do an exceptional job of displaying your efforts. Monday morning quarterbacks, here's your chance!

• **Soccer II**—They play the game the world over. Now you can enjoy the sport of soccer in your own home, played any one of four ways. Your PET will play against itself, oppose a single player, assist two competing players, or let two players compete without assistance.

• **Shoot**—Duck hunting can be a lot of fun...for everyone but the duck. Why not let your PET create the excitement for you? When you see the birds fly overhead, shoot'em down and rack up a big score. No license required.

• **Target**—Use your numeric keypad to control the puck as you try to maneuver it into the home position in the shortest possible time. Take turns with your friends. Whoever gets the lowest score wins.

0097P ..... \$ 7.95

## DUNGEON OF DEATH

*"Those who seek the Holy Grail  
Must fight, and walk a torturous trail.  
Eleven monsters thou must fight,  
Whilst searching through eternal night."*

Thus begins your journey into the Dungeon of Death, wherein you must descend to the twelfth level, locate the Holy Grail, and bring it back to the surface.

The Holy Grail is guarded by Smuag, the most fearsome monster of all, and ten lesser monsters who will challenge your every step. Fortunately, you have the ability to cast magic spells, and access to a variety of potions that may—or may not—help you. There are also chests within the cave that contain gold or magical items that will help you combat your gruesome foe. Old and young alike are sure to enjoy this fanciful simulation that unfolds like a fairy tale—with you as the star of the show. But step softly in the darkness...treasure or sudden death is only a footfall away!

0064P ..... \$ 7.95

## PERSONAL WEIGHT CONTROL AND BIORHYTHMS

**PERSONAL WEIGHT CONTROL/BIORHYTHMS** Let your PET help take care of your personal health and safety: • **Personal Weight Control**—Your PET will not only calculate your ideal weight, but also offer a detailed diet to help control your caloric intake. • **Biorhythms**—Find out where your critical days are for physical, emotional, and intellectual cycles. You'll need only a PET with 8K memory.

0005P ..... \$ 7.95

## MIMIC



**MIMIC** Test your memory and reflexes with the five different versions of this game. You must match the sequence and location of signals displayed by your PET. This one-player program includes optional sound effects with the PET 8K.

0044P ..... \$ 7.95

## PENNY ARCADE



**PENNY ARCADE** Enjoy this fun-filled package that's as much fun as a real penny arcade—at a fraction of the cost! • **Poetry**—Compose free verse poetry on your computer. • **Trap**—Control two moving lines at once and test your coordination. • **Poker**—Play five card draw poker and let your PET deal and keep score. • **Solitaire**—Don't bother to deal, let your PET handle the cards in this "old favorite" card game. • **Eat'Em-Ups**—Find out how many stars your gobbler can eat up before the game is over. These six programs require the PET with 8K.

0039P ..... \$ 7.95

## CHECKERS/BACARRATE

Play two old favorites with your PET. • **Checkers**—Let your PET be your ever-ready opponent in this computer-based checkers program. • **Bacarrat**—You have both Casino and Blackjack-style games in this realistic program. Your PET with 8K will offer challenging play anytime you want.

0022P ..... \$ 7.95

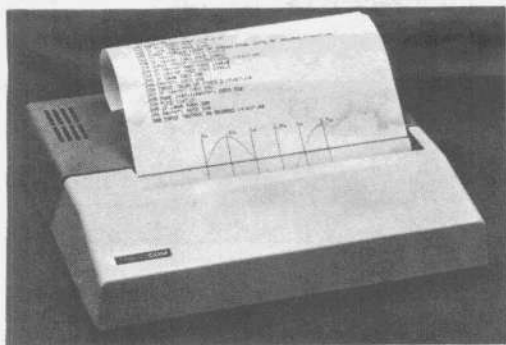
## TANGLE SUPER-TRAP

**TANGLE/SUPER-TRAP** These two programs require fast reflexes, and a good eye for angles: • **Tangle**—Make your opponent crash his line into an obstacle. • **Supertrap**—This program is an advanced version of Tangle with many user control options. Enjoy these exciting and graphically beautiful programs. For one or two players with an 8K PET.

0029P ..... \$ 7.95

# PRINTERS

## TREND COM



Print Speed: 40 characters per second • Line Feed: 50 milliseconds nominal • Character Set: 96 characters including upper and lower case, numerals, and symbols • Paper: 4-7/16 inch wide thermal paper.

**GRAPHICS**—Format: 480 seven-dot print position per line • Print Speed: 240 print positions per second • Control Code: Hex 9E clears buffer, causes line feed and carriage return, and starts graphics mode. Hex 9F clears buffer, causes carriage return, and starts text mode.

TREND COM 100 SAME AS 200 WITH GRAPHICS

**TRCO100** ..... \$495.95

TREND COM 200 ..... \$375.95

**TRS-80**: The T-80A is an interface cable for the TRS-80 user with Expansion Interface. The T-80B plugs directly into a TRS-80 and both modules recognize the Level II LLIST and LPRINT commands.

**T80A** ..... \$45.95

**T80B** ..... \$45.95

**Apple II**: The interface plugs into any slot in the Apple and incorporates print driver routines in ROM for the usual PR#n commands.

**TRCAII** ..... \$75.95

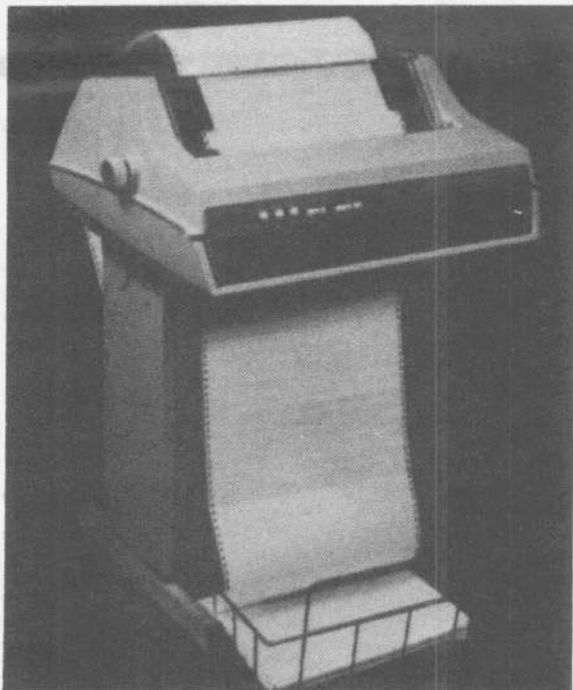
**PET**: The interface connects to the PET's IEEE 488 connector as Device 4 and is compatible with PET's CMD and OPEN commands. A through connector is provided to allow connecting other IEEE peripherals.

**TRCP2** ..... \$75.95

**Sorcerer**: The interface cable allows direct connection to the Sorcerer's parallel printer port.

**TRCSR1** ..... \$45.95

## TERMINET 340

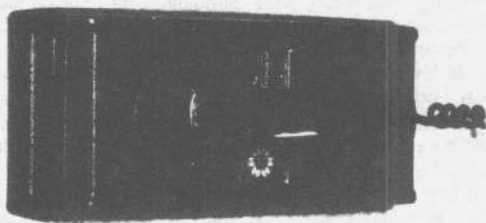


**DATA TRANSMISSION**—Code: USASCII 1968 • Interface: EIA Standard RS232C • Speed: 110, 200, 300, 1200 Baud • Type: Serial Asynchronous.

**PRINTING**—Type: Impact; rotating belt with fully-formed font • Spacing: 10 characters per inch horizontal; 6 lines per inch vertical • Paper width: Adjustable tractor from 3" to 14-7/8" wide • Character set: 94 Printable graphics of USASCII plus space including upper and lower case • No. of copies: Original plus five • Ribbon: Continuous ribbon-loop cartridge, 65 yds. x 3/4" wide nylon • Speed: 510 cps.

**75340** ..... \$4900.95

## NOVATION, ACOUSTIC COUPLER MODEL 4243A FOR TELETYPE 43

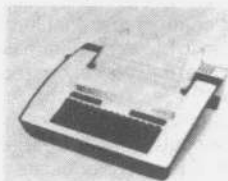


Careful, efficient engineering allows the 4143A to draw its power directly from the terminal, enabling customers to purchase the Teletype model 4320-AAA and eliminating the costly EIA RS232 interface.

Installation is a simple, two-minute procedure which does not require any cutting, soldering or wiring in the terminal and maintenance contracts for the Novation modem are available from Teletype. Originate, Type 103A.

**490162** ..... \$239.95

## TELETYPE 43



RS 232 C serial interface 110 or 300 baud • Upper/lower case full ASCII • Pin feed, 12" x 8 1/2" paper.

**TLYP43** ..... \$1195.95

**MODEL 765 AND 763  
MEMORY DATA TERMINALS  
CHARACTERISTICS GUIDE**



**763 Memory Send-Receiver Terminal**



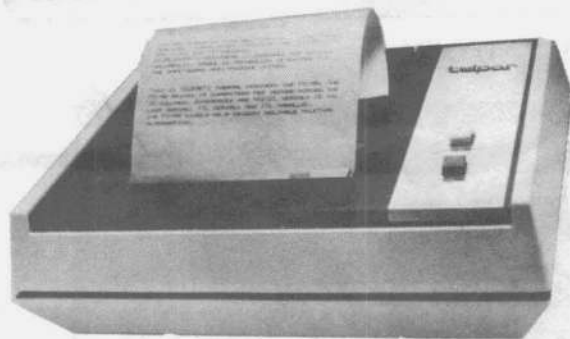
**765 Portable Memory Terminal**

The **Silent 700\*** Model 765/763 Memory Data Terminals are easy to use information gathering devices which allow the user to store required information at the originating source. This information can be transferred immediately into existing data processing equipment, thus eliminating all time consuming intermediate steps.

The new models are portable and weigh approximately 17 pounds. Each has a typewriter style keyboard, a quiet thermal printer, and a non-volatile magnetic bubble memory capable of storing 20,000 to 80,000 characters. The full editing capability of stored data allows the user to send only the corrected data to the central processing equipment and burst mode transmission reduces on-line telephone expenses. The model 765 has a built-in acoustic coupler so that communications can be accomplished using any desk telephone set. The Model 763 offers an optional originate only 113A type internal modem or a D.C. current loop interface. Both Models 765 and 763 provide EIA RS-232C compatible interface port for connection to an external asynchronous modem or for hard wired interfacing to other EIA RS-232C compatible devices.

765 BUBBLE MEMORY TERMINAL 25% DEPOSIT TIPA30348 .....	\$2695.95
763 BUBBLE MEMORY TERMINAL 25% DEPOSIT TIPA30347 .....	\$2395.95

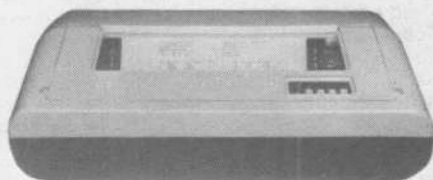
**TELPAR**



TTL parallel, TTL serial, RS232C serial, 20 mil loop serial. Quiet, clean—no ribbons or ink; 24 characters/second; Upper/lower case 96 ASCII characters; Signaling rates: Serial Mode—110 or 300 Baud; Parallel mode—up to 960 characters/second; For applications over 48 columns, automatically prints on next line; Prints 1 character at a time—ideal for interactive applications; Local line feed for advancing paper; Parity check (odd, even or none); ASCII control codes: back space, carriage return, line feed (implemented as a new line), vertical tab (1 line), negative vertical tab (on receipt of ESC, VT), Bell (9 microsecond pulse on receipt of BEL).

PS48C PRINTER PS48C .....	\$599.95
WITH KEYBOARD .....	
PS48K .....	\$799.95
Paper roll 5 1/2" x 164' .....	\$ 3.95

**LEAR SIEGLER 310 BALISTIC PRINTER**



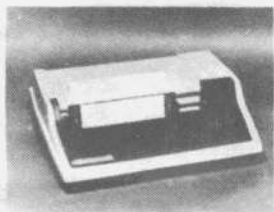
The 300 Series Ballistic Printer is a low-cost, 180 cps matrix printer with a built-in microprocessor that gives you 15 switch selectable form lengths, 15 perforation skip-over formats, and full horizontal and vertical tabulation control. Space and blank character compression. Interface control for serial; parallel, or polling and addressing operations. Plus, a non-volatile forms retention system that retains these programmable settings when power to the printer is turned off.

The 300 Series comes standard with a full 96 ASCII character set with up to 128 printables. Elongated character capability. And 10 or 12 pitch as standard.

For added application flexibility, the processor also gives the user print and font controls that enable the printer's 128 printables to be expanded to two sets of alternate character sets on a line-by-line basis. Great for applications requiring bilingual printouts. The model 310 (Serial Interface) comes standard with a 512 character buffer.

Like, all Lear Siegler printers, the 300 Series' dependability and negligible duty cycle restrictions originate with its patented Ballistic Print Head. It's designed to operate without moving cores attached to its print wires. Instead it uses small armatures that propel its matrix wires in free flight to the ribbon and platen for significantly greater head life.

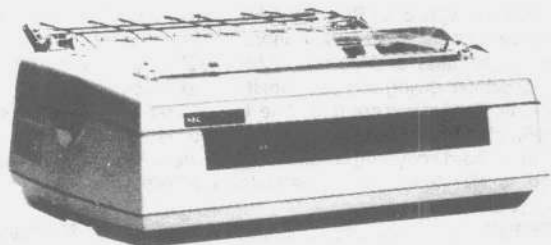
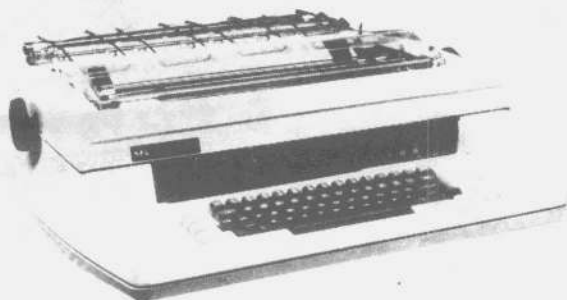
LSIA31862 .....	\$1899.95
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(Includes upper/lower case) • RS 232, 110-9600 baud • Adj. forms tractor • Maximum printing speed, 150 characters per second, bi-directional, microprocessor controlled. • Can be programmed for different forms lengths. • Forms, up to six, part, feed from bottom or back.

BASIC UNIT	
TIPA30899	\$1599.95
OPTIONS: FLC	
TIPA31173	\$ 99.95
FLC/CP	
TIPA31390	\$ 189.95
VFC	
TIPA31803	\$ 99.95
VFC/CP	
TIPA31172	\$ 169.95

## SPINWRITER MODELS 5510 and 5520

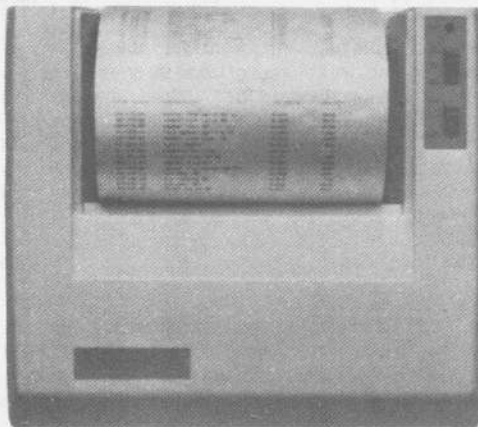


**Features**—KSR or RO Versions • EIA RS-232C/CCITT V.24 Interface Standard • 55 Characters Per Second Maximum Print Rate • Impeccable Print Quality (OCR Quality) • Microprocessor Electronics • High Resolution Plotting/Graphing • Lowest Operating Noise Level • Quick-Change Ribbon Cartridge • Quick-Change Print Fonts • Die-Cast Aluminum Covers • Self-Test Printing • Operator Engineered Control Panel • Prints Original and up to Seven Copies.

**General** NEC Information Systems' new Model 5510 Receive Only and Model 5520 Keyboard Send/Receive SPINWRITER terminals are microprocessor controlled serial, impact terminals designed for remote printing applications where impeccable print quality is required. The SPINWRITER terminals print up to 55 characters per second via the RS-232C/CCITT V.24 interface. The unique print element, called a print thimble, contains up to 128 fully formed characters. If the number of characters is limited to 125, a space is left so that the last characters printed are fully visible to the operator.

MODEL 5510 RO, WITH TRACTOR FEED, RIBBON, AND THIMBLE	
NECA30759	\$2795.95
5520 KSR WITH TRACTOR, RIBBON, AND THIMBLE	
NECA30762	\$3095.95

## COMPRINT

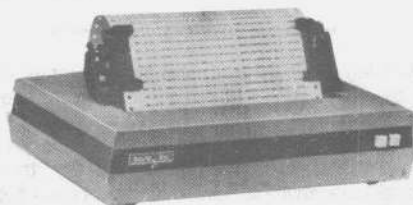


225 Characters second (170 lines/minute) throughput • Character Format—9 Horizontal x 12 vertical matrix • Characters/Line—80 **Buffer Memory**—Standard—256 bytes **Paper Requirements**—Electrosensitive type (aluminum coated), Width: 8 1/2", Max. (300') Roll Diameter: 3.7". **Interfacing**—Serial interface (model 912-5) • RS232 and 20 mA current loop, Baud rates 110, 150, 300, 600, 1200, 2400 and 4800 are strap selectable.

CPIA32118	\$579.95
<b>Interfacing</b> —Parallel Interface (model 912-P) • IEEE-488 and 8 bit parallel (strobe/acknowledge).	
CPIA32117	\$559.95

## 80-COLUMN IMPACT PRINTER

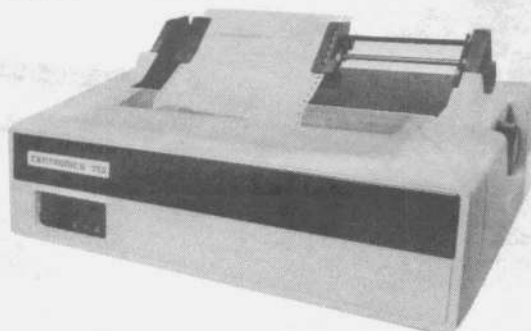
7 wire dot matrix, bi-directional, impact • 60 lines per inch throughput speed • 72, 80, 96, 120 or 132 switch or program selectable column capacity • Rear or bottom paper loading • RS232, 20 mA current loop, IEEE-488, Contronics® type parallel input/output provisions • Fifteen BAUD rates from 75 to 19,200 • two line buffer aux. char. font buffer memory • Power: 115VAC or 230VAC (switch select), 50 or 60 Hz.



800ST	\$559.95
WITH TERMINAL SCREEN BUFFER (1920 CHARS.)	
800STM	\$599.95



## CENTRONICS 700 SERIES SERIAL PRINTERS



Serial Printing to 370 LPM • Broad range and modular flexibility • Upward compatibility and optional features • High reliability and spare parts commonality. **Model 700** is a unidirectional serial printer giving the user flexibility to produce up to 132 column dot matrix printing. The Model 700 is designed for applications that require low throughput (13 to 90 lines per minute), hard copy output, such as CRT slave, instrument data logging, stand-alone business systems, off-line selective printing, or similar requirements.

**CEN7001** ..... \$1529.95

**Model 701** is a 60 character-per-second bidirectional printer that offers increased throughput by intelligently seeking the nearest character of the next print line (logic-seeking), thus eliminating time consuming carriage returns. Data can be printed from 25 to 120 lpm in formats up to 132 columns. The Model 701 is ideally suited for small business systems, banking/credit operations, medical laboratories and reservation systems, and many other applications.

**CEN7011** ..... \$1629.95

**Model 702** offers 120 character-per-second printing speed, and utilizes bidirectional, logic-seeking features to maximize throughput (to 260 lpm). The Model 702 features a standard 7 x 7 dot matrix pattern, and offers 7 x 9 and 9 x 9 as options to provide exceptional output versatility. The Model 702 provides an excellent price and performance choice which is ideally suited for use in distributive data processing and small business systems.

**CEN7021** ..... \$2019.95

**CEN7022** ..... \$1879.95

**Model 703** is a high-speed serial printer (180 characters per second) utilizing bidirectional, logic-seeking features to enhance throughput (70 to 370 lpm). In many applications, the Model 703 will out-perform line printers printing at 100-200 lines per minute. The Model 703 is offered as a solution to business system environments having high-speed, high throughput requirements and as an upgrade for 700/701 users.

**CEN7031** ..... \$2579.95

**CEN7032** ..... \$2439.95

**Model 753** is a single pass, high density (7 x 9) dot matrix printer designed for word processing and high quality business systems. At 130-150 characters-per-second, the microprocessor-controlled 753 offers up to five times faster throughput than daisy wheel printers (at about half the cost), and near letter quality output utilizing a nine pin free flight head to form up to 9 vertical and 18 horizontal dot placements in the generation of a single character.

**CEN7531** ..... \$2999.95

**Model 779**, capable of printing from 80 to 132 columns of 5 x 7 dot matrix characters at a rate of up to 90 lines per minute (60 CPS), sets a market standard for low cost, multicopy printing. The Model 779 is intended to be a basic output device utilizing a single logic board and simple operating controls. The Model 779 offers a cost-effective alternative to the user who requires dependable basic printing capability and no optional requirements.

**CEN7791** ..... \$ 999.95

**CEN7792** ..... \$1099.95

**Model 780** is Centronics' answer to users with limited space availability. This stylish low-profile machine (19.4" wide, 18" deep, and 8" high) is ideal for counter-top use in banks, airline terminals, or retail environments. Although it has an 80-column print format, 132-column forms can be produced using the condensed printing feature. Condensed printing on an eight-inch form results in substantial paper savings. The Model 780's 60 CPS print speed results in up to 90 lpm output, which is ideal for invoices, airline manifests, stock reports, data logging applications and CRT output.

**CEN7801** ..... \$1519.95

**Model 781** has the same attractive features as the Model 780, with one important addition—bidirectional, logic-seeking movement of the print head enabling higher throughput and providing an upgrade for 780 users.

**CEN7811** ..... \$1599.95

**Model 730** miniprinter is an operationally simple, compact (under 15 lbs), low-cost unit which combines computer-grade capabilities with a unique three-in-one paper handling system. The microprocessor-controlled 730 offers increased professional and small business applications through the built-in operator selectable ability to handle cut sheets, roll paper and fan fold paper interchangeably. Throughput of 100 characters-per-second on an 80 character line format, a complete upper and lower case 96 character ASCII set, and high quality 7x7 dot

matrix printing generated by the same heavy duty free-flight print head technology found in all Centronics 700 Series printers, make the 730 ideally suited for all personal and micro-computer systems. Specific applications include: direct mail letters, payroll, inventory listings, preprinted continuous forms and any others requiring this printer's demand document features.

**CEN7301** ..... \$ 819.95

**CEN7303** ..... \$ 849.95

CENTRONICS MICROPRINTERS



**CENTRONICS 700 SERIES TELEPRINTING**

110 to 9600 baud rates • Extensive character set selection • Spare parts commonality with 700 Series family. Model 704-3, the latest Centronics' line of data communications printers, affords the user high throughput from 70-400 lines per minute via the printer's 180 character-per-second print speed. It is capable of infinitely sustaining a 28 character line length at 1200 baud. Six other switch-selectable baud rates from 110,9600 are also available. Communications features include a built-in RS232C interface, operator switch-selectable line protocols, parity and stop bits, along with a 256 character buffer or optional 2K page buffer. A nine pin free-flight print head and a full 96 character ASCII set provide excellent print quality and combine with all other model features to make the 704 an unusually flexible and efficient data communications printer.

**CEN7041** ..... \$1995.95

**Model 761-4 KSR and Model 761-4 RO**—The 761 is offered in a keyboard send/receive (KSR) or a receive only (RO) configuration and is designed to sustain 300 baud transmission rates. The 761 Models print incrementally when data is entered from the keyboard and utilize intelligent bidirectional printing whenever received line lengths or transmission rates allow look-ahead viewing of buffered data. The Model 761 teleprinter may be used as input/output computer consoles, remote terminals in message switching, inquiry response, data entry/logging systems, and on-line timesharing systems.

**CEN761KSR** ..... \$1995.95  
**CEN761RO** ..... \$1595.95



**Non-impact desk-top • 150 lines per minute • Quiet, simple operation • Low cost-of-ownership. Model P1 and S1 Microprinters**—The Centronics Microprinter is a high-speed, desk-top, non-impact printer available in parallel (Model P1) and serial (Model S1) interface versions to satisfy a wide range of printer applications. The primary difference between the two models is the inclusion of an \$S232C serial interface and 192 character FIFO buffer in the Model S1 for remote applications. Both models employ state-of-the-art non-impact discharge technology. The Microprinter's simple design features require only four moving parts to produce variable pitch 5 x 8 dot matrix characters (at a rate of 150 lines per minute)—with exceptional clarity. The paper, which is available from Centronics and several other sources, requires no toners or ribbons. Instead, it carries a conductive aluminized coating which is vaporized by a low voltage discharge from the print head to produce highly readable characters. The Model P1 and S1 Microprinters are ideally suited for the following printer applications: home and hobby computers, microprocessor development systems, diagnostic systems, CRT hard copy output, industrial instrumentation, demand message printing, dispatch systems, and many others.

**CENP1** ..... \$419.95  
**CENS1** ..... \$489.95

**CENTRONICS 6000 SERIES LINE PRINTERS**

Line printing to 600LPM • Board speed range • Changeable print bands • Low cost-of-ownership. The 6000 Series—The 6000 Series is composed of four models: • Model 6075—75 lines per minute • Model 6150—150 lines per minute • Model 6300—300 lines per minute • Model 6600—600 lines per minute allowing selection of a line printer with the best price to performance ratio. The family members are fully compatible (as your printing requirements grow, you can move up to a higher speed machine) resulting in decreased training and conversion time. Each family member has been designed in a functionally similar configuration which results in high reliability and simple serviceability. An 85% spare parts commonality within family members minimizes parts inventory for multiple model users and users moving to higher speed machines.

**CEN60752D** ..... \$4099.95  
**CEN61502D** ..... \$4519.95  
**CEN63002D** ..... \$5259.95  
**CEN66002D** ..... \$5999.95

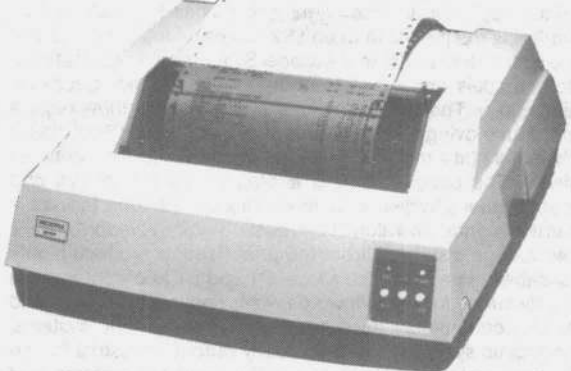


**ANADEX DP8000**

**Print Head Life Expectancy:** 100 million characters; wire, dot-matrix, impact, bi-directional, 9 x 7, Character Font; **Throughput Rate:** 112 cps nominal; **Number of Columns:** 80; **Printable Width:** 8.0 inches (203mm); **Character Height:** 0.11 inches (2.8mm); **Line Spacing:** 6 lines per inch. **Paper (Fan Fold):** Width: 9.5" (241mm) including 0.5" (12.7mm) sprocket hole margins each side. **Number of Copies:** Original, plus 3 copies. **paper Thickness:** 0.018" (0.45mm) total maximum. **Paper Loading:** Through the bottom or rear. **Paper Feed:** Pin Drive actuated by solenoid and ratchet, independent of printing, at 10 lines per second. **Ribbon:** Unicolor. 0.5" (12.7mm) wide, standard Underwood Plastic Spools. **Physical:** Pressure-formed plastic case 18.6" (472mm) Wide x 14.2" (36mm) Deep x 7.3" (185mm) High. Front mounted POWER switch and indicator. Front mounted FEED switch. Front mounted **TOF SET** switch (Top of Form) used to set form starting point. Front mounted ON/OFF LINE switch and indicator allows printer to ignore input data. Indicator illuminates when printer is ON LINE. FIFO is cleared when printer is switched OFF LINE. **Power:** 105-125V RMS, 60 Hz. 210-250V RMS, 50 Hz optional. (120 Watts, nominal). power option to be specified on order.

**ADP8000** ..... **\$899.95**

**MICROTEK MT-80 SERIES PRINTER**



The MICROTEK MT-80 is a completely self-contained Alphanumeric Line Printer ideally suited for personal computers, business, and industrial applications. Three basic interface configurations are available—parallel (MT-80P), serial (MT-80S), and IEEE-488 (MT-80G). Feature for feature, the MT-80 is miles ahead of the competition, with dependable performance, quick factory service, and an incredibly low price. **FEATURING:** 80 or 120 Columns plus Double Width Printing, 125 CPS (70 LPM) Nominal Throughput, 9 x 7 Dot Matrix, 96 character (upper and lower case) ASCII Set, Switch Selectable Uni-Directional or Bi-Directional Printing, Pin Feed Paper Handling System, Vertical Format Unit (Includes Top-of-Form Control, Vertical, Tabs, Adjustable Forms Length, and Variable Skip-Over-Perforation Length, Forms width continuously adjustable between 4.5" and 9.5", 1K to 4K Data Buffer Option, Prints Original Plus 3 Copies, Uses a Reliable, Proven Print Mechanism. A full ONE YEAR WARRANTY, and Three Character Size: (1) Standard (10 characters per inch, 80 characters per line), (2) Double Width (5 characters per inch, 40 characters per line), (3) Compressed (15 characters per inch, 120 characters per line). You can even intermix different character sets on the same line!

**PARALLEL**  
**MT80P** ..... **\$715.95**  
**SERIAL**  
**MT80S** ..... **\$799.95**  
**IEEE**  
**MT80G** ..... **\$859.95**

**DAISYWHEEL TERMINAL THE SPRINT 5 FROM QUME**



Available as a KSR Terminal or RO Printer the Sprint 5 provides quality font printing for a variety of end user and OEM applications.

The Sprint 5 gives you the high quality, high speed daisywheel printing technology that has made Qume successful in word processing.

Serial interface. • MultiColor™ ribbons. • Letter perfect printing at 45 or 55 cps. • Over 50 different type styles including APL, scientific symbols and international character sets. • Smart microprocessor utilization for powerful flexibility. • 43 Qume-defined commands for operator control. • Convenient switch selectable functions on front panel. • Built-in diagnostics

- SPRINT 5/55 KSR, 55 CPS W/TRAC
- QUMA30863** ..... **\$3195.95**
- SPRINT 5/55 RO, 55 CPS W/TRAC
- QUMA31986** ..... **\$2795.95**
- SPRINT 5/45 KSR, 45 CPS W/TRAC
- QUMA30862** ..... **\$2995.95**
- SPRINT 5/45 RO, 45 CPS W/TRAC
- QUMA30864** ..... **\$2695.95**
- QUME MAINT/TRNING MANUAL
- QUMA30864** ..... **\$ 26.95**
- QUME M/S RIBBON MIN. ORDER 2
- QUMA41974** ..... **\$ 4.95**

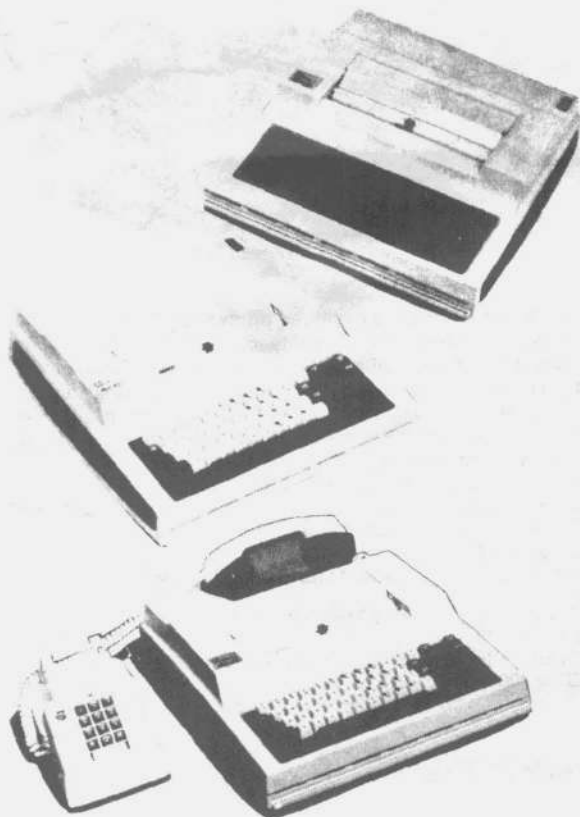
**DECWRITER IV LA34**



110 or 300 baud, RS232 serial interface • Upper/lower case, 9 x 7 dot matrix • 10, 12, 13.2, or 16.5 characters per inch • Uses friction feed, paper width to 15".

- DEC12134** ..... **\$1295.95**
- TRACTOR FEED
- DEC34TF** ..... **\$ 129.95**
- NUMERIC KEYPAD
- DEC121NK** ..... **\$ 129.95**

EXECUPORT 4080



Prints up to 80 positions • Prints full ASCII and/or APL character sets • Superscripts, subscripts and underlines • Operates in upper case only or in upper and lower case—switchable • Prints 6 line/inch vertical and 10 characters/inch horizontal • 1/4 line feed (forward and reverse direction) • Transmits at 100 or 300 baud—switchable • Serial interface • Operates half or full duplex line or local • Modem and KSR can be operated independently • Odd, even or mark parity—switchable • 5 x 7 dot matrix characters • Thermal printing process • Friction drive for paper • Automatic carriage return and line feed at 81st column • Built-in coupler and modem • Horizontal tabbing • Print head position indicator • Built-in self test • Plots—Bi-directional 1/4 line stepping • Operates in originate or answer mode • Embedded numeric pad • New line • Parity error display • True upper and lower characters • ASCII and ASCII/APL keyboards in teletype or typewriter format • Prompt view feature • Out-of-paper alarm • Operator bell alert • New line switch.

52554080 ..... \$2395.95

**STANDARD FEATURES—High Speed**—Permanent records are printed at operator selectable speeds of 10 and 30 characters per second. Increased efficiency is achieved with true 30 cps throughput, i.e., no filler required after line feed or carriage return characters.

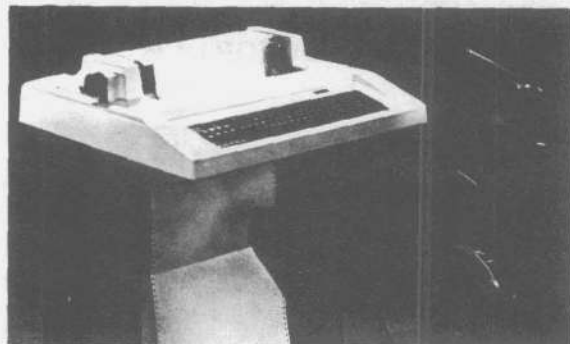
**Quiet Operation**—TI's unique solid state printhead develops characters on thermal sensitive paper and eliminates the undesirable noise associated with impact printing.

**Microprocessor Reliability**—TI microprocessor, MOS/LSI integrated circuits, solid state printhead, and a minimum of moving parts are keys to performance and reliable, long life operation. • Standard ASCII keyboard with calculator type embedded numeric key pad and two key roll-over. • 5 x 7 dot matrix with print contrast control. • Switch selectable half or full duplex operation.

**OPTIONAL FEATURES Full ASCII Keyboard**—Standard Model 745 will decode and print upper case data received from the communications line. The Full ASCII Keyboard option enables the user to generate lower case data from the keyboard for direct transmission and print lower case data. The option provides and UPPER CASE ONLY key which prevents the Full ASCII Keyboard from generating lower case data for those applications where the user does not desire lower case.

- 745 KSR W/FULL ASCII
- TIPA32197 ..... \$1599.95
- 745 KSR LIMITED ASCII W/ACOUSTIC COUPLER
- TIPA30898 ..... \$1395.95
- 743 KSR W/FULL ASCII 25% DEPOSIT
- TIPA32157 ..... \$1145.95
- 743 KSR LIMITED ASCII
- TIPA30345 ..... \$1045.95
- 743 RO LIMITED ASCII 25% DEPOSIT
- TIPA30344 ..... \$ 895.95

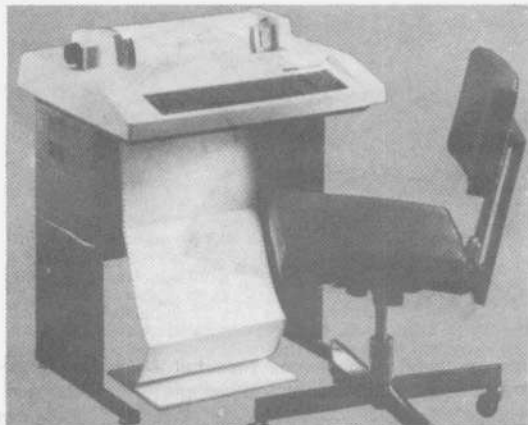
LA120 DECWRITER III PRINTER



The LA 120 DECwriter III, DIGITAL's 180 cps hardcopy terminal, boosts throughput by combining bidirectional smart printing and a 1K character buffer with fast horizontal and vertical skipping over white space. The LA 120 also offers over 45 board-selectable features. These features include variable font sizes, tabs, form lengths, and many other features previously available only as options. To guide the operator through the myriad of possible configurations, the carefully human-engineered terminal uses mnemonic commands, prompting LED display, and a special decal and convenient pocket-sized operator card for easy reference of available formats.

- LA120RO
- DECA31719 ..... \$2095.95
- LA120KSR
- DECA 32918 ..... \$2299.95

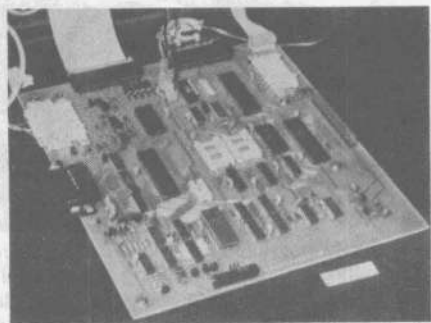
LA 36 DECWRITER



—The LA36 DECwriter is a fast high quality stand alone keyboard printer designed for use as a economical hardcopy interactive terminal for timesharing or local input/output applications. It is useful in business applications for low volume output and production of multiple copies. **Features**—The DECwriter is a quiet reliable 7 x7 dot matrix impact printer that operates at 110 or 300 Baud serial interface, a speed of 15 to 30 characters per second tractor-fed on 132 column lines. It features a full 128-character ASCII keyboard, including 96 upper and lower case alphanumerics, and 32 control characters. In addition, 8 keyboard switches define user-selectable options such as Baud rate and lower to upper case conversion. The adjustable tractor feed permits rapid form placement and one to six ply forms from 3" to 14 7/8" wide.

LA36KSR  
DECA30087 ..... \$1499.95

1200 BAUD UPGRADE FOR LA36



—The DS120 can be installed in minutes and requires no special tools or technical skills. The card is plug-compatible with the existing electronics and no irreversible modifications is involved. Complete installation instructions are included with each DS120 unit. Among the special features of the DS120 is the Double Wide Character Set which allows the highlighting of the titles and headings in the text. The Self-test feature provides a preprogrammed print routine for verifying proper operation of the terminal.

DS120 ..... \$ 849.95

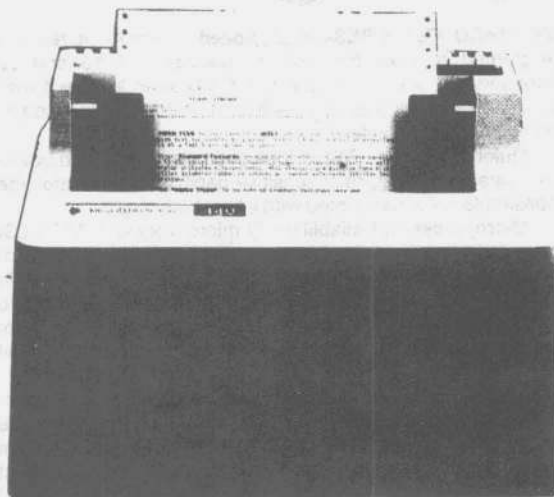
DIABLO



**Diablo 1650** Long life metalized printwheel produces superior print quality on up to 15 part forms. •Bidirectional paper and carriage movement simplifies proportional spacing and graphics. • Colum spacing is variable, up to 120 positions per inch. • Line spacing is variable, up to 48 positions per inch. •Standard RS232 serial interface, 110-1200 baud with forms tractor.

DIABLO 1650 METAL-WHEEL KSR  
DIAA300078 ..... \$3295.95  
DIABLO 1650 METAL-WHEEL RO  
DIAA300077 ..... \$2895.95  
Similar to the 1650 except that the plastic daisywheel prints up to 45 cps.  
DIABLO 1640 PLASTIC WHEEL KSR  
DIAA300079 ..... \$3195.95  
DIABLO 1640 PLASTIC WHEEL RO  
DIAA300075 ..... \$2795.95

PAPER TIGER



**Unbeatable capability.** The Paper Tiger prints just about any paper for your need. From address labels to multicopy invoices and legal-size reports.

Adjust the tractor width from 1-3/4 to 9-1/2 inches. Choose from 8 switch-selectable forms lengths. Print 6 or 8 lines per inch.

**Unmatched versatility.** Want graphics? Add the Paper Tiger's software-selectable full dot plotting graphics. Print illustrations, block letters, charts, graphs, and more.

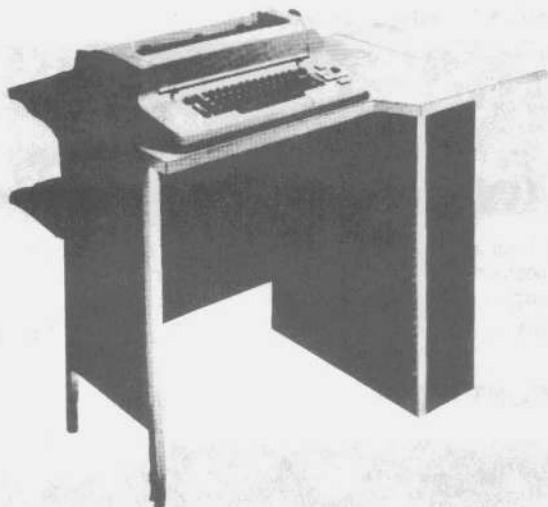
162172 ..... \$ 899.95  
WITH GRAPHICS OPTION  
162173 ..... \$1099.95

**DATA—TRANS 1000**

A completely refurbished IBM Selectric Terminal with built-in ASCII Interface.

**Features:** 300 Baud Input • 14.9 characters per second printout • Reliable heavy duty Selectric mechanism • RS-232C Interface • Documentation included • 60 day warranty-parts and labor • High quality Selectric printing Off-line use as typewriter • 15" carriage • 36" wide, 29" deep, 24" high.

- DTR1000** ..... \$1395.95
- TRACTOR FEED**
- DTR1000TF** ..... \$ 139.95



**OKIDATA**

80 characters per second, 80 to 132 columns that are program selectable, line spacing which is programable 6 or 8 lines per inch, 9 x 7 dot matrix, upper and lower case.

- SERIAL PRINTER**
- OKIA32964S** ..... \$899.95
- PARALLEL PRINTER**
- OKIA32964P** ..... \$899.95
- TRACTOR FEED**
- OKIDATAFD** ..... \$139.95

**TERMINET® 200**



**Broad application flexibility** • KSR, RO or Line Printer convertible • Choice of four code or switch-controlled print compressions • Switch selectable six-or eight-lines/inch • **Operator Interface** • Convenience-engineered controls • Long-life, easy change ribbon cartridge • Low noise—meets

ISO NR-60 acoustic noise standard • Adjustable alarm sound level • Front panel test switch. **Print quality** • Long-life, operator-replaceable printhead • Straight-wire printhead design • 7 x 9 matrix character formation • Forms thickness lever • Accepts up to 9-part forms • Servo-controlled printhead. **Paper handling** • Accepts 2-inch to 16-1/2 inch width • Front and rear loading • Both horizontal and vertical vernier paper position adjustment • Six-pin tractor engagement • Low paper sensor • Paper out sensor • 13.6 inch long print line (136 columns at 10 character/inch, 224 columns at 16.5 characters/inch.) • Forms length switch, 1 to 199 lines. **Line Printer** • Two 256 character buffers • 100 kilo-character/sec data transfer • Bi-directional printing • Micro-processor programmable interface

- GE200 KSR** ..... \$2195.95

**KSR/RO** • Last character visibility • Switchable end-of-line alarm position • 200 characters/second maximum printing speed • 60 in/sec printhead advance • 1K Buffer • 20 inches/second paper slew

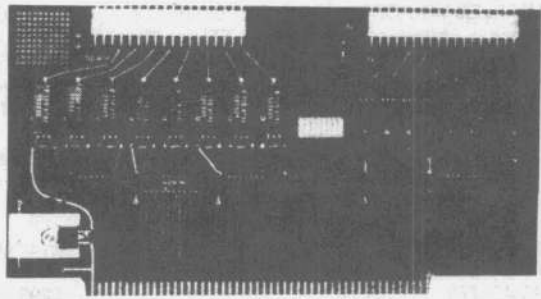
- GE200 RO** ..... \$2095.95

**S-100 HARDWARE**

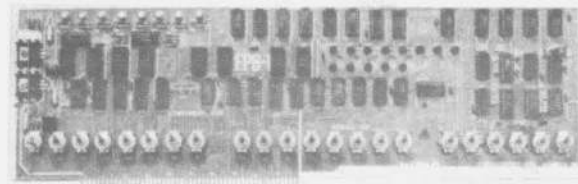
**OPTO-ISOLATOR**

8 fast reed relays respond to an 8 bit word. Also, 8 opto-isolators accept an 8 bit word from outside and send it to your computer for handshaking or further control purposes. Good for model railroad, burglar alarm, audio switching, automated display, ham radio and other uses.

- Assembled**
- CK001** ..... \$179.95



## FRONT PANEL BOARD

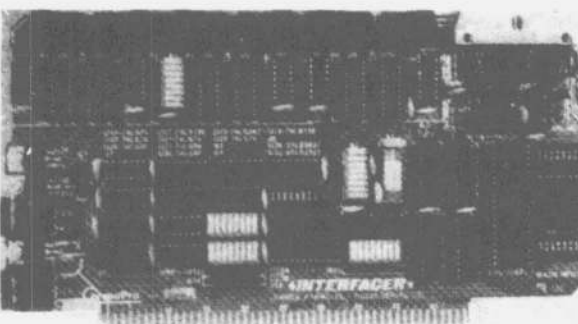


All data is displayed in hexadecimal using eight inexpensive 7-segment LED's. The displays are divided into four groups.

BARE BOARD

FPB1 ..... \$49.95

## FRONT PANEL

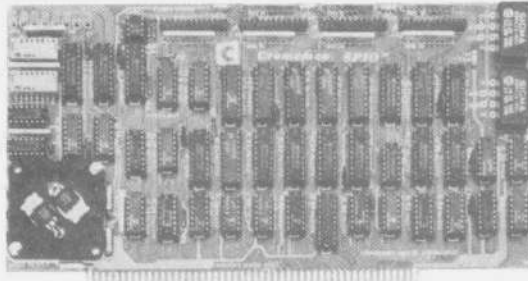


Replaces front panel of existing system or forms nucleus of custom system. Unambiguous 7 segment displays and 12 pad keyboard simplify data loading and exam. Slow step feature allows you to step through the program at variable from 1 to 2000 steps per minute.

KIT

CK013 ..... \$249.95

## 8 PORT I/O MULTI-CHANNEL MICROCOMPUTER PARALLEL INTERFACE



PARALLEL I/O PORTS: Number of bidirectional port: 8 • I/O port width: 8 bits wide • Input load: 4 TTL loads • Output drive: 4 TTL loads. • INPUT STROBES: Latched • OUTPUT STROBES: Delay: 1  $\mu$ sec after new data valid • Width: 1.5  $\mu$ sec; negative true • 1 strobe pulse per port • OPTO-ISOLATOR INPUT: Number of Opto Inputs: 2 bits, TTL level input • RELAY OUTPUTS: Number of relay outputs: 2 bits • Contact voltage: 28V AC or DC • Contact current: 1 AMP • Contact type: SPDT • Power requirements: +8 volts at 1.5A.

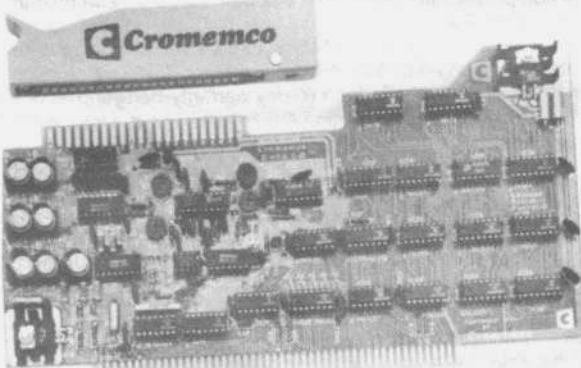
8P I/O KIT

CROK30773 ..... \$195.95

8P I/O ASSEMBLED

CROA30773 ..... \$295.95

## ANALOG I/O BOARD D+7A I/O MULTI-CHANNEL INTERFACE



Cromemco's D+7A board is a high-performance I/O module which provides an easy, fast and inexpensive way to get analog information into and out of your computer. The D+7A provides 7 channels of 8-bit analog-to-digital conversion, 7 channels of digital-to-analog conversion, an 8-bit parallel I/O port to input and output data in digital form, and a fast conversion time of 5.5 microseconds.

The D+7A makes it easy to use your computer for jobs such as process control, digital filtering, games, oscilloscope graphics, speech recognition and many others. The board is assembled.

7 input ports. • Input voltage range: -2.56 to +2.54 volts • Input bias curr.: 2 microamps max • Input Impedance: 20, Megohms || .001  $\mu$ F, 1K Hz sample rate. • 2 Megohms || .001  $\mu$ F, 10K Hz sample rate. • Resolution: 8 bits • Conversion time: 5.5 microsec. • Accuracy:  $\pm$ 20 millivolts.

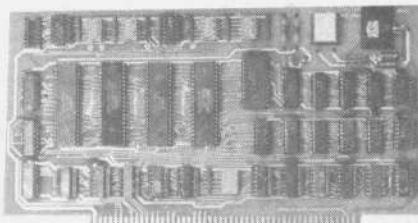
7 output ports. • Output voltage range: -2.56 to +2.54 volts • Output impedance: 0.25 ohm. • Max. load current: 1.5 mA • Resolution: 8 bits • Conversion time: 5.5 microsec. • Drift rate: Less than 10 m V/sec at 25°C.

8 bit Parallel I/O Port • Input load one TTL equivalent • Output drive: 10 TTL loads • General Information: Bus. S-100 -18 volts @ 60 mA.

ASSEMBLED

CROS30773 ..... \$179.95

## SERIAL I/O



Four Serial I/O RS-232 ports, S-100 Bus, Software or jumper selectable baud rates (110, 300, 600, 1200, 2400, 4800, 9600, 19.2K), on board Xtal baud rate generator, Switch selectable addressing, Switch selectable parity or no parity (odd or even) 1 or 2 stop bits, 5 to 8 bits/character.

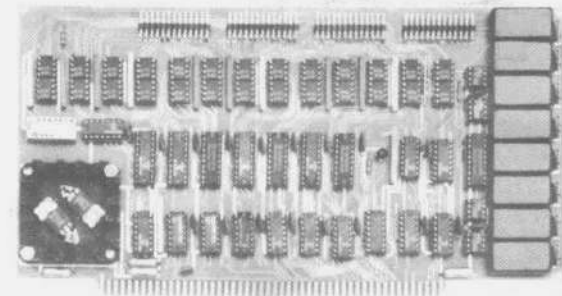
BOARD ONLY

7908 ..... \$29.95

KIT

7908A ..... \$199.95

## 4 PORT I/O ISOLATED PARALLEL INTERFACE



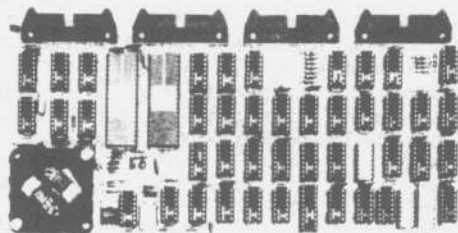
Cromemco's 4PIO board provides parallel interfacing with complete electrical isolation from your microcomputer. Electrical isolation means that problems with ground noises and ground loops can be completely eliminated in your instrumentation, communications or process control systems. The 4PIO parallel interface card includes 24 opto-isolated input channels, 16 opto-isolated output channels, 8 relay-isolated output channels, 11 opto-isolated strobe handshake lines, and 1 opto-isolated reset time. The 4PIO is assembled and tested (Model 4PIO-W).

**Parallel I/O Ports:** No. of bidirectional ports: 4 • I/O port width: 8 bits wide • No. of opto-isolated input ports: 3 • No. of opto-isolated output ports: 2 • No. of relay-isolated output ports: 1 • No. of I/O strobe bits: 11 • Strobe signal isolation: opto-isolated • Reset Line: opto-isolated • No. of opto-isolator: 52 • Opto-isolator type: MCT66 • Signal levels: TTL • No. of relay outputs: 8 • contact type: SPDT • Contact voltage: 28V AC or DC • Contact current: 1 A • Power requirements: +8 Volts @ 2.3 A.

4PIO-W ASSEMBLED  
CROA30771 .....

\$389.95

## CK-027 INTERFACE II TRIPLE PARALLEL/RS232 SERIAL I/O BOARD



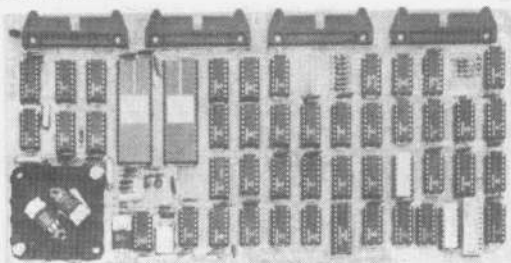
The new Interface II I/O board incorporates one channel of serial I/O with all the features of the INTERFACER dual RS232 serial board, plus 3 full duplex Parallel ports. The serial section includes all the features you've come to expect—a hardware UART, on-board crystal controlled Baud rate generator, hardware/software programmability, RS232 handshaking lines with real RS232 drivers, current loop and TTL drivers, full interrupts and more!!! The parallel section utilizes LSTTL octal latches for latched input and output data with 24 mA drive current, attention, enable and strobe bits for each parallel port (each with selectable polarity), interrupts for each input port, separate 25 pin connectors with power for each channel and a status port for interrupt mask and port status. All in all—an incredibly flexible and easy to use board.

ASSEMBLED AND TESTED

GDCK027 .....

\$239.95

## SERIAL I/O



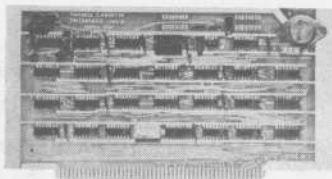
2 independently addressable serial ports (dip switch selectable addresses) • Real LSI hardware UARTs for minimum CPU housekeeping • RS232C, current loop (20 mA), and TTL signals on both ports • Precision, crystal-controlled Baud rates up to 19.2K Baud (individually dip switch selectable) • Transmit and receive interrupts on both channels, jumperable to any vectored interrupt line • Industry standard RS232 level converters with five RS232 handshaking lines per port • Optically isolated current loop with provisions for both on-board and off-board current sources • UART parameters, interrupt enables, and RS232 handshaking lines are software programmable with power-on hardware default to customer specified hard-wired setting for maximum flexibility • Port connectors mate directly to ribbon cable and DB25 connectors in standard pinouts • RS232 lines will conform to either master or slave configurations • Board gives full feature operation with both 2 and 4 MHz systems • Lower power consumption: +8V @ 450 mA; +16V @ 150 mA; -16V @ 70 mA max. • No software initialization required for board operation, although board parameters may be altered by software.

MOD. CK-002

GDCK022 .....

\$239.95

## CASSETTE INTERFACE THE INDUSTRY STANDARD



By Tarbell

**EASY TO USE** The Tarbell Cassette Interface board plugs directly into your ALTAIR 8800 or IMSAI 8080 Computer. Serial to parallel and parallel to serial conversion is performed on the board.

This interface will work with most audio cassette recorders. It's been used with reel-to-reel tape recorders, and can be easily adapted to automatically (software) controlled digital cassette units.

**IT'S FAST** Up to 540 bytes per second (2200 bits per inch) using a high-quality cassette recorder. 187 bytes per second (800 bits per inch) is the suggested standard using a mid-quality recorder.

Software provided includes input/output driver routines, bootstrap, read-only memory program, and a BASIC program for saving and loading data. A Processor Technology Software Package #1, which is a combined editor and assembler, and which has been extensively modified for saving and loading files to and from cassette, is available separately for \$10. A 24K Tarbell Cassette BASIC is also available for only \$48.

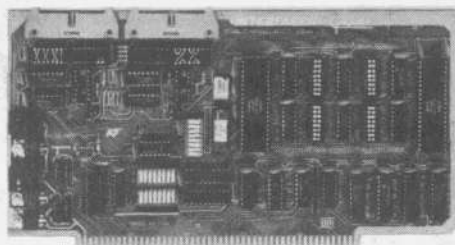
ASSEMBLED AND CHECKED OUT

TAR2820 .....

\$175.95



## SERIAL I/O/PARALLEL I/O +TIMER



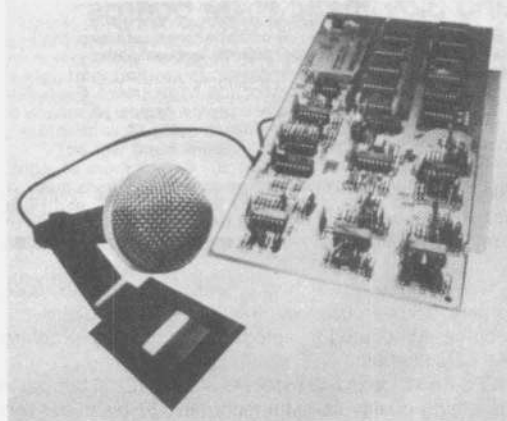
**TU-ART digital interface with many features.** Cromemco's TU-ART digital interface is a convenient interface for CRT terminals, line printers, modems, and other devices. The TU-ART has two serial I/O ports, two 8-bit parallel I/O ports, and 10 independent programmable interval timers, also has vectored prioritized interrupts so it is able to support the powerful vectored interrupts structure of the Z-80 microprocessor. The 10 interval timers have real-time clock capability and consequently offer a wide range of control possibilities. The TU-ART is assembled and tested.

**Serial I/O Ports:** No. of ports: 2-232 or 20 mA • I/O levels: RS232 or 20 mA curr. loop • Low Baud range: 110-9600 Baud (software selectable) • High Baud range: 890-76,800 Baud (software selectable) • **Parallel I/O Ports:** No. of ports: 2 • Input ports: 8-bits • Output ports 8-bit • Input load: one TTL equivalent • Output Drive: 20 TTL loads • 10 timers • Timer range: 0-16.32 msec. (software selectable) • Timer resolution: 64 microseconds • **Vectored Interrupts:** No. restart locations (8080 model): 8 • No. restart Lcs. (Z-80 model): 65,536 • Prioritization of TU-ART ports: internally prioritized • Prioritization for multiple TU-ARTs: daisy-chaining • UART Type: 5501 • Power requirements: +8V -18V • Operating environment: 0-55°C

ASSEMBLED AND TESTED

CROA30060 ..... \$289.95

## SPEECHLAB



SpeechLab recognizes the spoken word using pattern matching techniques • SpeechLab provides voice input and control for all S-100 bus computers, such as the Processor Technology Sol, Cromemco, Polymorphic, Imsai, Altair, Vector Graphics • Use it for data entry to replace keyboard input quality assurance, control, games and speech research.

MODEL 20

HURA30120 ..... \$279.95

NOISE CANCELLING MIC.

NC2 ..... \$ 84.95

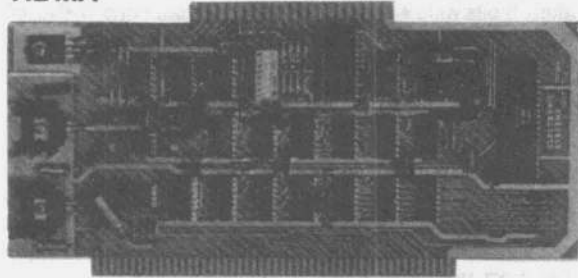
## D.C. HAYES MICORMODEM



Fully S-100 bus compatible including 16-bit machines and 4 MHz processors. • Two software selectable Baud rates—300 Baud and a jumper selectable speed from 45 to 300 Baud. (110 standard). Supports originate and answer modes. • Direct-connect Microcoupler. This FCC-registered device provides direct access into your local telephone system, with none of the losses or distortions associated with acoustic couplers and without a telephone company supplied data access arrangement. • Auto-Answer/Auto-Call. the MICROMODEM 100 can automatically answer the phone and receive input; it can also dial a number automatically. • Automatic Reset and Disconnect. • Software compatible with the D.C. Hayes Associates 80-103A Data Communications Adapter.

DCHA32625 ..... \$379.95

## TIDMA



With this Tape Interface Direct Memory Access board you can record and play programs without a bootstrap loader (no prom.). This can be up and running as fast as putting it in the socket. It takes complete control of the S-100 bus and reads or writes directly into the memory without the need for the microprocessor. It has an FSK encoder/decoder for direct connections to a low cost cassette recorder at 625 Baud, and inputs and outputs for direct connections to a digital recorder at any Baud rate. This board is S-100 bus compatible.

BOARD ONLY

112 ..... \$ 35.95

WITH PARTS KIT

112A ..... \$110.95

## SYSTEM MONITOR

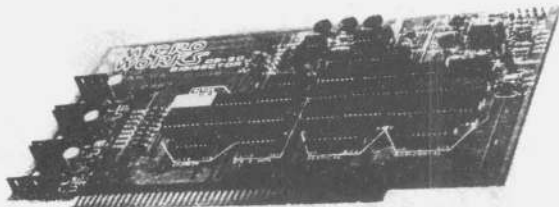
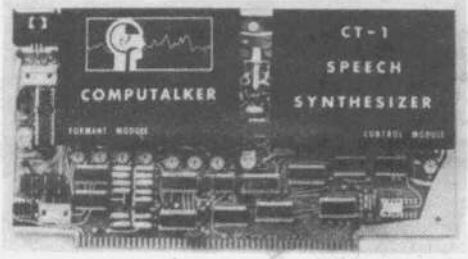


8080, 8085, or Z-80 System monitor for use with the TIDMA board. There is no need for the front panel with this software. It comes on cassette tape at 600 Baud, mark is 1600 Hz, space is 2400 Hz, location is from 0 to 4FF. Commands include: Examine, alter, dump, test, or verify memory; move a block of memory; fill a block of memory; execute a program. Complete with documentation.

SYSMON79 ..... \$ 12.95

**COMPUTALKER SPEECH SYNTHESIZER**

**DIGISECTOR**



The **COMPUTALKER** Model CT-1 Speech Synthesizer is a high quality voice generator unit designed for the Standard S-100 I/O bus configuration. The synthesizer is controlled by 9 acoustic-phonetic parameters transmitted on the micro-computer data bus. These parameters control the perceptually and physiologically fundamental aspects of speech as determined by contemporary phonetic research.

- SPEECH SYNTHESIZER**
- CMTA30042** ..... \$394.95
  - SOFTWARE PACKAGE #1 FOR N.S.
  - CMTCS50434** ..... \$ 34.95
  - SOFTWARE PACKAGE #2 FOR N.S.
  - CMTCS52199** ..... \$ 29.95
  - 8" DISK (CPM)
  - CMTD52329** ..... \$ 44.95

The Micro Works Digisector® is a random access video digitizer; High Resolution—a 256 × 256 picture element scan • Precision—64 levels of grey scale • Speed—conversion times as low as 4 microseconds per pixel • Versatility—accepts either interlaced (NTSC) or non-interlaced (industrial) video input • Compatibility—any S-100 system conforming to IEEE standards.

The computer sends the Digisector two 8 bit addresses (X and Y coordinates), and the Digisector returns the digitized brightness of the image at the specified location. For set-up and monitoring purposes the Digisector produces an output comprised of the camera's video signal plus a superimposed cursor, showing exactly where the DS-80 is looking

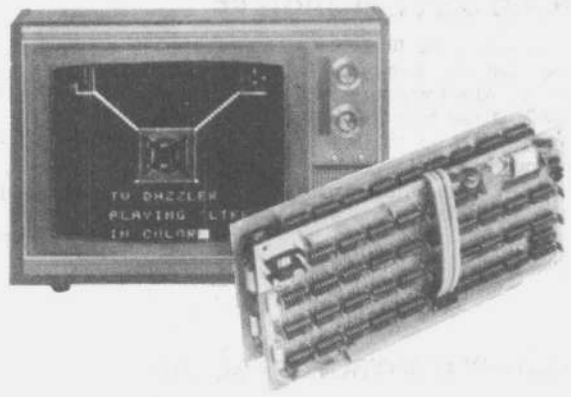
The software supplied will digitize one pixel every other horizontal scan line, filling 8K of memory with two 4 bit grey scale values per byte in a little less than two seconds. It provides spatial resolution of 128 × 128 elements, optimum for computer portraiture and slow scan TV. This software is compatible with the Vector Graphic High Resolution Graphics Display Board. Additional routines are provided to drive both graphics and ASCII printers.

Applications include precision security systems, moving target indicators, computer portraiture, fast to slow scan conversion for ham radio operators, and salvation for a Droid in dire need of a wall socket. With clever software, the Digisector can read paper tape, punched cards, strip charts, bar codes, UPC codes, schematics and musical scores.

The Digisector, like all Micro Works products, comes fully assembled, tested and burned in. Give your computer the gift of sight!

- MWDS80** ..... \$339.95

**TV DAZZLER**



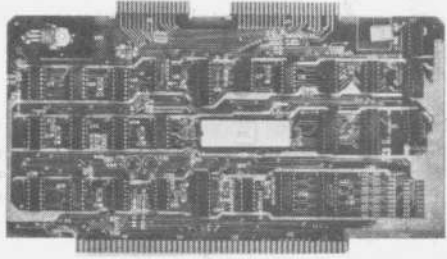
...microcomputer interface that lets a color TV be your computer display terminal.

**ALPHANUMERICS PLUS ACTION, AND GRAPHICS**—The Dazzler® maps your computer memory content onto your color TV screen in full color. That doesn't mean just that you see alphanumeric in color. You can display any information in memory. And do so in color. The Dazzler consists of two circuit boards that plug directly into your S-100 Computer.

**DAZZLER GAME**—A set of over a dozen games you can play with the Dazzler. Available on either 5" or 8" diskettes. Each diskette includes: CHESS, SPACE WAR, 4D TIC-TAC-TOE, TANK WAR, DAZZLE-MATION, CHASE, TRACK, DAZZLE-DOODLE, GOTCHA, LIFE, KALEIDOSCOPE, DOGFIGHT, MAGENTA MARTINIM and AMBUSH.

- KIT**
- CG1K** ..... \$215.95
- ASSEMBLED
- CG1W** ..... \$349.95

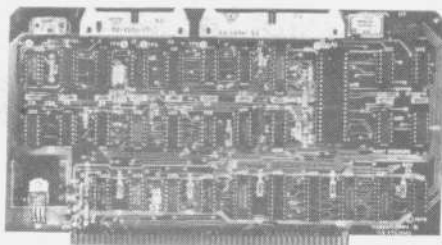
**DISK CONTROLLER**



**VERSAFLOPPY**—Single Density Disk Drive Controller • IBM 3740 Compatible Soft-Sector Format • Operated with both Standard (8") and Mini (5") Drives • Provides Control for Single or Double-Sided Operation • Controls up to Four Drives Simultaneously • Operates with SDOS or CP/M Disk Operation System • Operates with Z80, 8080, and 8085 Central Processing units • Utilizes FD1771B-1 Controller Device • Control and Diagnostic Software Available in PROM • Interrupt Operation Optional.

- KIT**
- SDVFK** ..... \$159.95
- ASSEMBLED
- SDVFA** ..... \$229.95

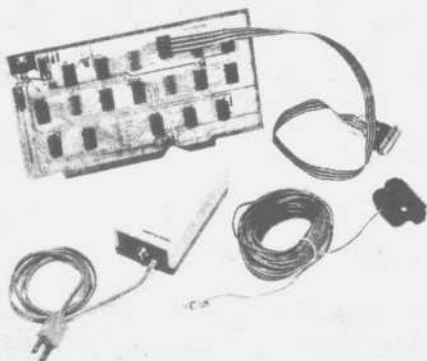
## DISK CONTROLLER CONTINUED



**VERSAFLOPPY II—Enhanced Flexible Disk Drive Controller •** IBM 3740 Compatible Soft-Sector Format for Single Density Drives • Operates with Single and Dual-Sided Drives, Single or Double Density Drives and 5" and 8" Drives in any Combination of Four Simultaneously • Drive Select and Side Select Circuitry • Vectored Interrupt Operation Optional • Phase locked Loop Data Recovery Circuits • Operates with Z80 CPU's • Uses FD 1791-1 Controller Chip • Recommended for Use with SBC-100 or SBC-200 • Control and Diagnostic Software available in PROM.

KIT	
SDVF2K	\$309.95
ASSEMBLED	
SCVF2A	\$389.95

## REMOTE POWER CONTROL

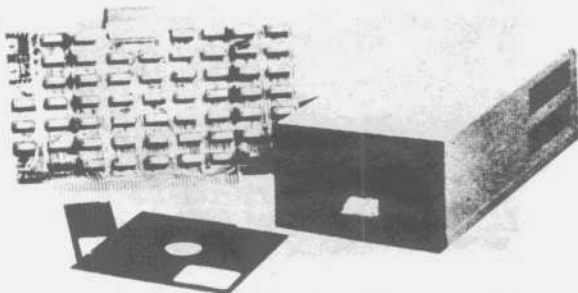


Microcomputer control of AC power line switching—Power switching is accomplished at the desired point of control using remote Power Control Units (PCU's). System Interconnections between controlling logic and PCU's are low level control signals, eliminating the need for lengthy runs of AC power cabling.

**SIMPLE SOFTWARE ACCESS**—The Control Logic Interface boards use a single peripheral device address to allow independent control of up to 32 PCU channels. A single byte output from the processor selects an individual channel, and turns it on or off without affecting the state of any other channels. Program control of PC3200 channels is straightforward, and can be accomplished with a single BASIC statement if the interpreter in use has peripheral I/O capabilities. By Canada Systems Inc.

SINGLE OUTLET POWER CONTROL UNIT (PCU)	
PC3202	\$239.95
16 CHANNEL CONTROL LOGIC INTERFACE (CLI)	
PC3216	\$ 49.95

## DOUBLE-DENSITY MINI-FLOPPY DISK



Double Density M<sup>2</sup> FM encoding • Interfaces up to 3 Shugart SA400, SA450 or MPI B-51, B52 • Disk capacity (per side): 179,200 bytes 35 tracks—204,800 bytes 40 tracks • Data transfer rate: 25,600 bytes per second, average • 250 byte bootstrap PROM on controller card • Track to Track seek time: 40 ms/Track with Shugart Drives—10 ms/Track with MPI Drives.

<b>MODLE MS204—SINGLE DRIVE</b>	
MS2041	\$ 589.95
DUAL DRIVE	
MS2042	\$ 965.95
TRIPLE DRIVE	
MS2043	\$1346.95
CP/M D.O.S.	
MS2044	\$ 98.95
MICROSOFT DISK BASIC (RUNS UNDER CP/M)	
MS2045	\$ 195.95

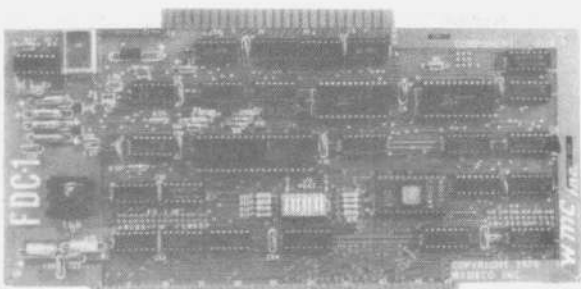
## THE KONAN SMC-100 HARD DISK CONTROLLER

The Konan SMC-100 controller board is the key to these new, high capacity combinations. The Konan controller is a two-board set which fits into any standard S-100 bus. Each SMC-100 can control up to four drives.

Features of the new Konan controller include direct memory access that permits the transfer of data to or from any memory location, full sector buffering, sector interlacing, and automatic CRC generation and checking.

KONA31957	\$1799.95
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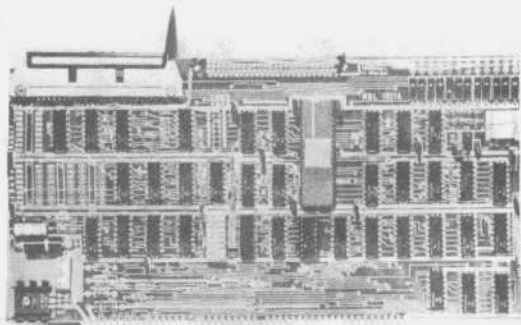
## FLOPPY CONTROLLER BOARD



Will drive up to 8 Shugart, Pertek, Remex 5" and 8" drives, on board PROM with power boot up, will operate with CPM (not included). Made by Wameco Inc. PCBD.

BOARD ONLY	
FDC1	\$ 42.95

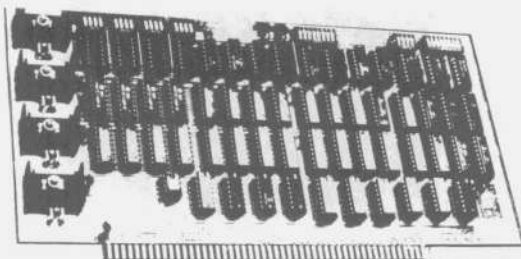
## FLOPPY DISK CONTROLLER



**Tarbell Floppy Disk Interface Designed for Hobbyists and Systems Developers** • Handles up to 4 standard single drives in daisy-chain. • Operates at standard 250K bits per seconds on normal disc format capacity of 243K bytes. • Hardware includes 4 extra IC slots, built-in phantom bootstrap and on-board crystal clock. Uses WD 1771 LSI Chip. • 6-month warranty and extensive documentation.

KIT	
TARK30323 .....	\$198.95
CP/M FOR SAME	
TARD50627 .....	\$ 96.95

## 16K STATIC RAM

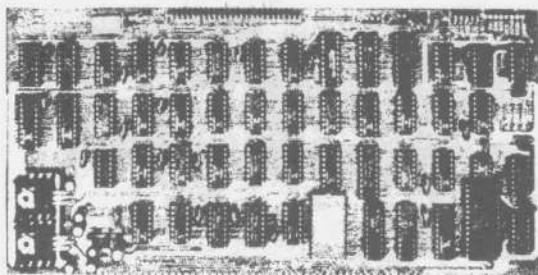


Fully static • Uses popular 2114 static RAMS • +5 volt operation only • Bank select available by bank port and bank byte • Phantom line capability • Addressable in 4K blocks • 4K blocks can be addressed anywhere within 64K in 4K increments • can be built up 4K at a time • Fully buffered • Meets IEEE proposed S-100 signal standards • LED indicators for board selection and bank selection • FR-4 epoxy PC boards • Solder masked on both sides • Silk screen of part number and part designator • Available in kit, assembled and tested, or bare board • Industrial model available (CCS Model 2916) for production systems.

MOD. M-XVI CALIFORNIA COMPUTER SYSTEMS—BARE BOARD

CCS2016BK .....	\$ 29.95
450 ms ASSEMBLED AND TEST	
CCS2016BA .....	\$295.95
450 ms KIT	
CCS2016BAK .....	\$255.95
300 ms ASSEMBLED AND TEST	
CCS2016BB .....	\$329.95
300 ms KIT	
CCS2016BBK .....	\$289.95
200 ms ASSEMBLED AND TEST	
CCS2016BC .....	\$339.95
200 ms KIT	
CCS2016BCK .....	\$299.95

## DISK CONTROLLER



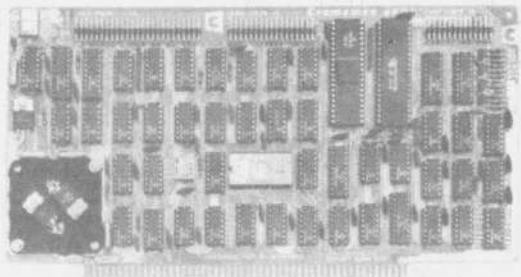
**DISK CONTROLLER**—Many functions on one card • Includes disk bootstrap monitor • RS232 interface.

**SIMULTANEOUSLY INTERFACES UP TO FOUR DISK DRIVES.** This card is not only a disk controller but also an I/O interface. Placing many functions on this one card is possible because we have taken the step of using LSI circuitry. The card is capable of simultaneously interfacing up to three 5" drives or four 8" drives. Its interface provisions include a RS232 serial interface with a Baud range up to 76,800 Baud. The bootstrap monitor is contained in a 1K 2308 ROM.

**TECHNICAL SPECIFICATIONS 4FDC DISK CONTROLLER AND I/O INTERFACE. DISK CONTROLLER:** Maximum number of 5" drives: 3 • Maximum number of 8" drives: 4 • Bootstrap/Monitor firmware: 1K byte PROM • Controller circuitry: MOS LS<sup>1</sup> • **SERIAL I/O PORT:** I/O levels: RS232 or 20 mA current loop • Low Baud range: 110-9600 Baud (software selectable) • High Baud range: 880-76,800 Baud (software selectable) • **PARALLEL PORT:** Input port: 8 bits • Output Port: 8 bits • Input load: one TTL equivalent • Output drive: 20 TTL loads • **INTERVAL TIMERS:** Number of timers: 5 • Timer range: 0-16.32 msec (software selectable) • Timer resolution: 64 microseconds • **GENERAL INFORMATION:** Disk controller type: 1771-1 • UART type: 5501 • ROM type: 2308 • Bus: S-100 (one slot only) • Power requirements: +8 volts @ 1.0A • +18 volts @ 100 mA • -18 volts @ 100 mA • **DISK CONTROLLER CARD KIT**

CROK300052 .....	\$379.95
DISK CONTROLLER CARD ASSEMBLED	
CROA300052 .....	\$569.95

## DISK CONTROLLER

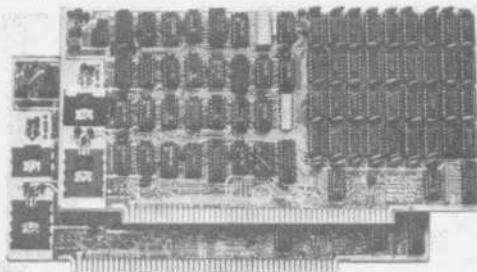


Micromation. Performance Counts. Micromation's solid state design incorporates write precompensation electronics and a phase lock oscillator on a single, all digital circuit board, one year warranty.

**POWER REQUIREMENTS:** +8 Volts at 1.1 Amp • +16 Volts at .1A Amp • -16 Volts at .1 Amp • **SERIAL PORT:** UART type 8251 • Interface RS232 • Baud Rate 110 to 9600. **FIRMWARE:** 2708 EPROM. **ERROR RATE:** Less than one recoverable error per 10<sup>9</sup> bits read. **CAPACITY:** Single Density 256K bytes per side • Double Density: 512K bytes per side.

<b>S10522 .....</b>	<b>\$439.95</b>
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## 16K and 32K RAM



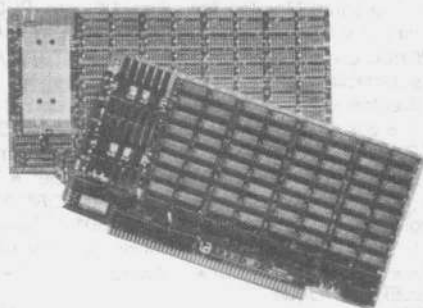
Bank selectable, addressable to 8K, parity checking. 16K dynamic RAM Board, 4 MHz, includes all documentation.

32K RAM Board—Similar to RAM-16-A board (Rev. 3), except that there is twice as much memory and the parity capability is included. Features such as rock-solid dependability, 4 MHz operation, bank-switching, and switch selectability of addresses are still present.

BOARDS, ASSEMBLED BY NORTH STAR—RAM16A

NORA20219 .....	\$329.95
RAM32A .....	
NORA32204 .....	\$389.95

## 8K STATIC RAM MEMORY BOARD

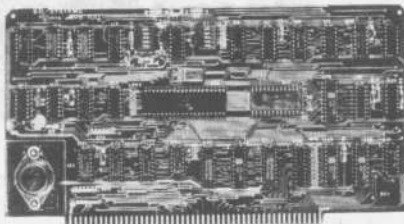


Memory protect/unprotect. • Power-on-clear. • Selectable 0, 1, 2, 3 wait states • 8192 8 bit words. • Addressing: Two independent 4K halves selectable by DIP switch. • Fully buffered address, control, and data lines. Capacity: 8192 bytes (64 2102 type 1K x 1 Static RAMS)

ASSEMBLED AND TESTED—450 ns

A8KSRS .....	\$164.95
ASSEMBLED AND TESTED 250 ns	
A8KS RF .....	\$194.95

## Z80 CPU

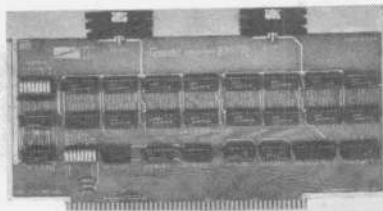


Z80 Central Processing Unit • 2 MHz or 4 MHz Operation • Power-On Jump to any 4K Boundary • On-Board Socket for Up to 4K PROM • Front Panel Usage Optional • Optional Wait State on M1.

MPF-100 KIT

SDSMPB1 .....	\$199.95
ASSEMBLED AND TESTED	
SDSMPB1A .....	\$259.95

## 8K ECONORAM IIA

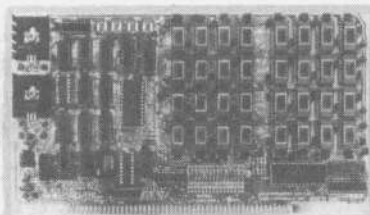


NEW 8K Econoram IIA board retains all the best selling features of the old Econoram II PLUS is now 4MHz STANDARD—still static—with **ultra** low power consumption. S-100 compatible. Single supply required—guaranteed maximum current under 900 mA. Typical boards draw 700 to 800 mA. Phantom feature is included on the new Econoram IIA and is switch selectable. Organized as two 4K independently addressable blocks. Includes switched WRITE protect-block and board disable. Also, has provision for memory management.

ASSEMBLED AND TESTED

GB8KIIAAT .....	\$169.95
CSC .....	
GB8KIIACSC .....	\$219.95

## 64K RAM BOARD



**DMB6400 SERIES (Bank Select)**—Memory bank select which is compatible with Alpha Micro, CROMEMCO, NORTH STAR, and other systems using output port bank select.

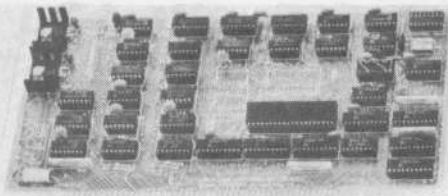
Each DMB6400 board is configured as four 16K byte banks, two 32K byte banks, one 64K byte bank, or any combination of the above.

Each bank may be selected individually for starting addresses at 0000H, 4000H, 8000H, or C000H. Eight banks of 16K, 32K, 48K, 64K bytes or any combination may be selected for up to 512K bytes for each output port. Any of the 256 output ports may be selected (including CROMEMCO 40H and NORTH STAR COH) to provide capability to supply up to 131 Megabytes of fast, reliable RAM. Memory bank select is both hardware and reliable RAM. Memory bank select is both hardware and software selectable for use in systems that do not yet provide bank select or multi-user software. 4MHz operation with no wait states in Z-80, 8080, or 8085 based systems (3 MHz for 8085). Reliable, low power—8 watts maximum (64K byte version). Fully guaranteed for one year on parts and labor. Compatible with: ALPHA MICRO, CROMEMCO, NORTH STAR, and most other Z-80, 8080, or 8085 based systems using single or multi-user software.

ASSEMBLED AND TESTED

DMB6400 .....	\$949.95
NO BANK SELECT	
DM6400 .....	\$759.95

**Z80 CPU**



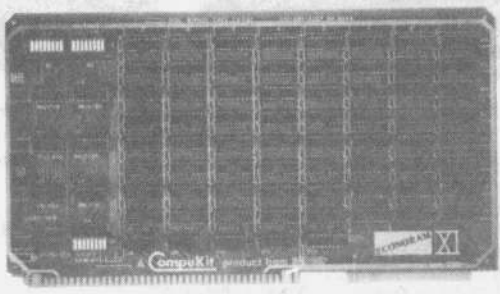
The North Star Z80A processor board brings the 4 MHz Z80A microprocessor to the S-100 bus. The Z80A runs compatible programs at least twice as fast as an 8080. Even greater speed advantages can be obtained when the extended Z80A instruction set is used. The North Star Z80A processor board (Z80-A) can run in systems either with or without front panels. The Z80-A is fully compatible with S-100 type front panels. An auto-jump feature permits a branch to any 16-bit address in the computer at power-on and reset. In the HORIZON computer, this feature is used to start the bootstrap disk load PROM on the disk controller board. In other systems, the feature might be used to start a PROM monitor or other bootstrap procedure.

The Z80-A includes space to add 1K bytes EPROM (2708 type) as an option, making it possible to permanently store programs on the board. This feature would not normally be required in a HORIZON system, but might be used to contain a monitor or bootstrap program in other applications which might require it.

The Z80-A also implements an 8-level vectored interrupt capability, and has a jumper option for adding a wait state to all memory used in the computer.

**Power:** 7 amp @ +8 volts, unregulated.  
**Z80A PROCESSOR BOARD ASSEMBLED AND TESTED**  
**NORA10221** ..... \$249.95

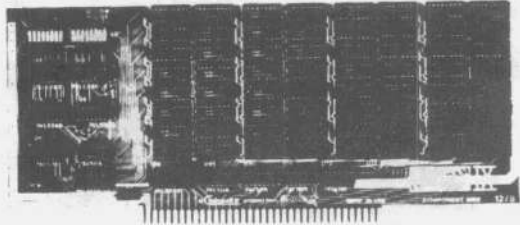
**32K FOR SBC ECONORAM XI**



At last! Static storage for SBC systems (as far as we know, the only static production board for SBC). Guaranteed to run 4 MHz with Z-80 CPUs. Also can be used with 8080 and 8085 systems. Direct plug in with 80/10, 80/20 and 80/30 CPUs plus others. Has remote WRITE protect and individual addressing up to 256K bytes). The Econoram XI is ONLY available qualified under the Certified System Component (CSC) program (200 hours burn-in, guaranteed 4 MHz operation over the full temperature range, serial numbered, and immediate replacement in event of failure within one year of invoice date).

- 8K CSC
- GB8KCSCII** ..... \$439.95
- 16K CSC
- GB16KCSCII** ..... \$649.95
- 32K CSC
- GV32KCSCII** ..... \$995.95

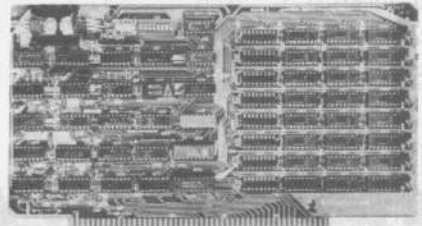
**32K ECONORAM IX**



STATIC memory. Configured as two 4K, one 8K and one 16K block—all independently addressable and disableable. Guaranteed 4 MHz operation. Uses low power 4K x 1 RAMS. Current consumption guaranteed less than 3A. Typical boards draw less than 2.7A.

- 16K ASSEMBLED AND TESTED
- GB16ATN** ..... \$369.95
- 32K ASSEMBLED AND TESTED
- GB32ATN** ..... \$629.95

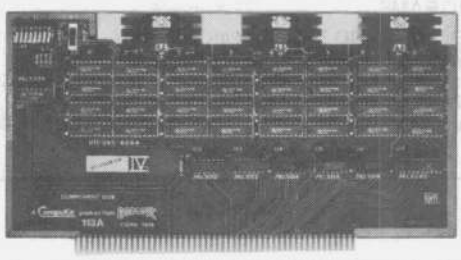
**EXPANDORAM**



S-100 Bus Compatible • Expandable memory from 8K to 64K • Power Dissipation—5 watts, Typical • Compatible operation with 8080, 8085, Z80 CPU • Interfaces with: IMSAI, ALTAIR, SOL-8 Cromemco, SBC-100 • Direct Memory Access Available • DIP Switch for positioning boundaries • Bank Selectable Write Protect • Phantom Output Disable.

- WITH 16K
- SDS3800a** ..... \$499.95
- WITH 32K
- SDS38002** ..... \$679.95
- WITH 48K
- SDS38003** ..... \$824.95
- WITH 64K
- SDS38004** ..... \$849.95

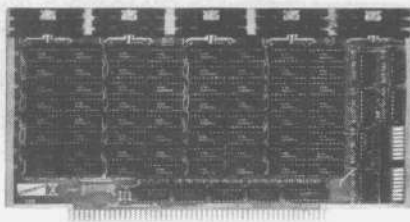
**16K ECONORAM IV**



16K x 8 memory board that draws under 2000 mA (guaranteed). Typical boards draw less than 1.5A. Runs DMA 2 or 4 MHz operation. Uses 4K x 1 proven reliable STATIC memories..configured as a single 16K block addressable on 16K boundaries. manual WRITE protect switches protect 4K blocks and can be used with or without phantom line.

- ASSEMBLED AND TESTED
- GB16KATF** ..... \$319.95
- CSC
- GB16KCSCF** ..... \$419.95

## 32K ECONORAM X

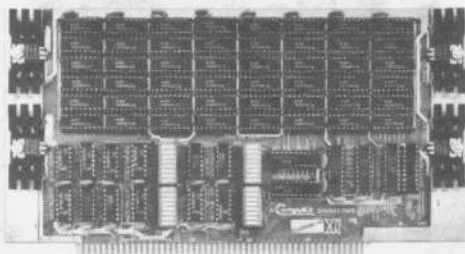


Static storage for the S-100 bus. Guaranteed 4 MHz operation. Configuration as two 8K and one 16K block, all independently addressable, protectable and enableable. Suitable for use in phantom systems. Extra select/deselect qualifiers for systems using more than 64K of memory make this board the ideal building block for large memory systems.

16K ASSEMBLED AND TESTED

<b>GB16KATX</b> .....	<b>\$329.95</b>
16K CSC	
<b>GB16KCSCX</b> .....	<b>\$429.95</b>
32K ASSEMBLED AND TESTED	
<b>GB32KATX</b> .....	<b>\$439.95</b>
32K CSC	
<b>GB32KCSCX</b> .....	<b>\$769.95</b>

## ECONORAM XII-24



Bank select—4 MHz operation. Maximum current consumption guaranteed less than 2500 mA. Two independent banks, individual phantom—256 ports DIP switch selectable. Configured as three 8K blocks all independently addressable on 8K boundaries. Each block may be deselected with a single switch. Perfect for Alpha Micro Systems. Marinchip and similarly structured machines. Of COURSE they use 4K x 1 low power STATIC RAMS.

ASSEMBLED AND TESTED 24K

<b>GB24KAT</b> .....	<b>\$529.95</b>
XT .....	
CSC 24K	
<b>GB24KCSCXT</b> .....	<b>\$639.95</b>

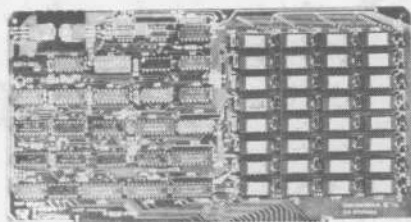
## 16K STATIC RAM

Operates with any speed or power 2114. All input and output lines are fully buffered. Addressable in 4K Byte increments. If the system has a front panel, the board will allow itself to be protected. If there is no front panel, the board will not allow itself to be protected. The board has Bank Address capability. Phantom Disable, MWRITE, and selectable wait states. By Wameco.

BARE BOARD

<b>MEM2</b> .....	<b>\$ 29.95</b>
WITH PARTS KIT	
<b>MEM2K</b> .....	<b>\$359.95</b>

## EXPANDORAM II

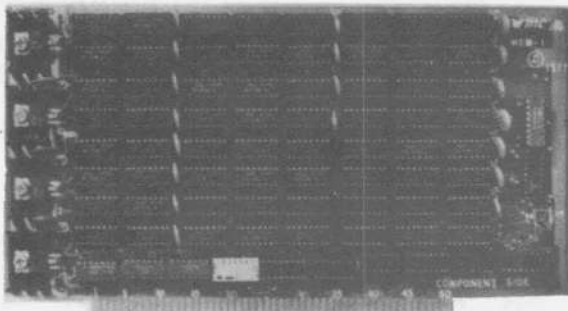


4 MHz Operation • Expandable Memory from 16K to 256K using 16K and 64K devices • DIP Switch selectable boundaries at any 16K or 64K boundary • Page Mode Operation Allows up to 8 boards on a Bus • Operates with Z80 CPUs • Phantom Output Disable and a manual Switch Selectable Output Disable • Power Dissipation—5 watts, Typical • Wait States and Invisible Refresh Synchronized • 4-64K Banks are available with 4164's • Board Select for Multi-User System.

ASSEMBLED AND TESTED 16K

<b>SDS38020</b> .....	<b>\$569.95</b>
ASSEMBLED AND TESTED 32K	
<b>SDS38021</b> .....	<b>\$739.95</b>
ASSEMBLED AND TESTED 48K	
<b>SDS38022</b> .....	<b>\$919.95</b>
ASSEMBLED AND TESTED 64K	
<b>SDS38023</b> .....	<b>\$999.95</b>

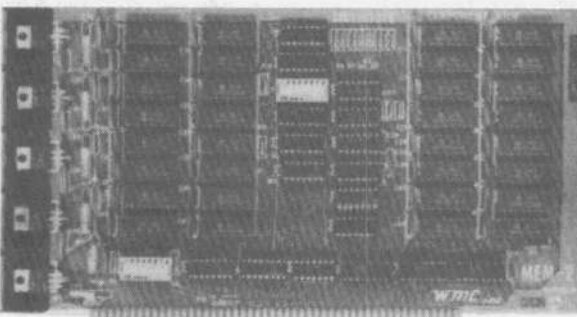
## 8K STATIC RAM



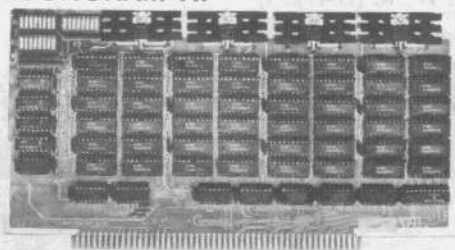
Operates with any speed or power 2102. All input and output lines are fully buffered. PROTECT/UNPROTECT, delays, Phantom Disable, and MWRITE can be selected. Selectable in 8K increments.

BARE BOARD

<b>MEMIA</b> .....	<b>\$ 29.95</b>
BOARD WITH PARTS KIT	
<b>MEMIAK</b> .....	<b>\$168.95</b>
BOARD WITH PARTS BUT NO 2102's KIT	
<b>MEMIAKA</b> .....	<b>\$ 75.95</b>



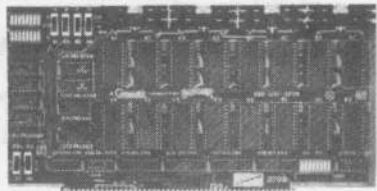
## 24K ECONORAM VII



24K x 8 board that's GUARANTEED to draw less than 2500 mA for cool, conservative operation. Typical boards draw less than 1.8A. Runs DMA 2 or 4 MHz operation. Configured as two 4K and two 8K blocks (each independent) for unique addressing options. Can be used with or without phantom lines and has provisions for two qualifiers for user designed bulk memory, bank select or other applications. Uses 4K x 1 proven, reliable static memories.

- ASSEMBLED AND TEST 16K
- GB16KATS ..... \$329.95
  - CSC, 16K
  - GB16KCSCS ..... \$429.95
  - ASSEMBLED AND TEST, 24K
  - GB24KATS ..... \$475.95
  - CSC, 24K
  - GB24KCSCS ..... \$595.95

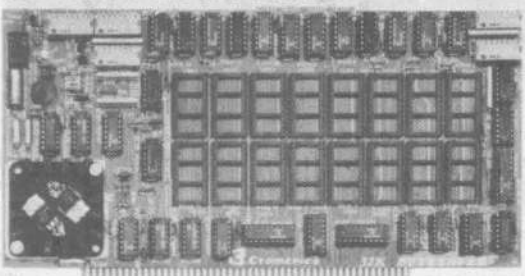
## ECONOROM 2708



Has provisions for wait states for 4 MHz operations. Configured as four 4K blocks—each independently addressable and disableable. Power-on jump. Does NOT include 2708s. Includes all support chips, sockets, regulators, heat sinks, etc.

- ASSEMBLED AND TESTED
- CK021 ..... \$ 85.95

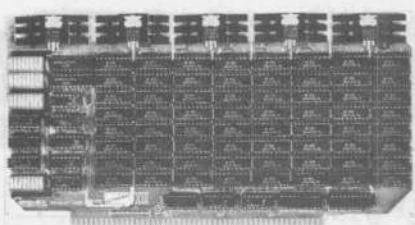
## 32K BYTESAVER® MEMORY BOARD WITH 2716 PROM PROGRAMMER



Cromemco's 32K BYTESAVER® card provides an on-board 2716 PROM programmer. Information can be stored quickly and permanently by a simple, one-time write of the desired data into an erased PROM with the on-board programmer turned on.

- Memory Capacity: 32K Bytes • Memory Type: Intel 2716 PROM or equivalent • Memory Access Time: 450 nanoseconds • Wait States at 2 MHz: none required • Wait States at 4 MHz: one per machine cycle • Bus: S-100 • Power Requirements: +8V at 2.1A, max.
- ASSEMBLED
- 32KBYT41 ..... \$195.95

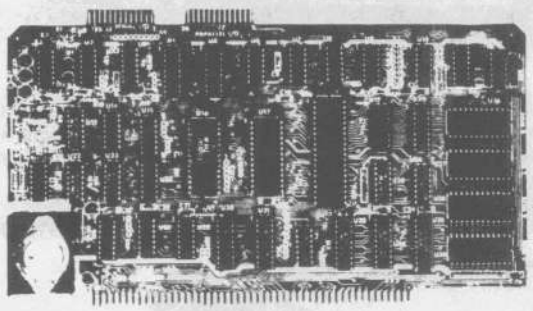
## ECONORAM



32K BANK SELECT! S-100 compatible, 4 MHz guaranteed operation (0-70 C). Features two 16K blocks independently addressable on 16K boundaries. Two independent banks—individual phantom—256 ports DIP switch selectable...each block may be deselected with a single switch. Perfect for use in Alpha Micro Systems, Marinchip and others. Uses 4K x 1 low power STATIC RAMS. Current consumption guaranteed 3500 mA max.

- ASSEMBLED AND TEST 16K
- GB16KATXMA ..... \$399.95
  - CSC 16K
  - GB16KCSCXM ..... \$499.95
  - ASSEMBLED AND TEST 24K
  - GB24KATXMA ..... \$529.95
  - CSC 24K
  - GB24KCSCXMA ..... \$639.95
  - ASSEMBLED AND TEST 32K
  - GB32KATXMA ..... \$549.95
  - CSC 32K
  - GB32KCSCXM ..... \$799.95

## SINGLE BOARD COMPUTER



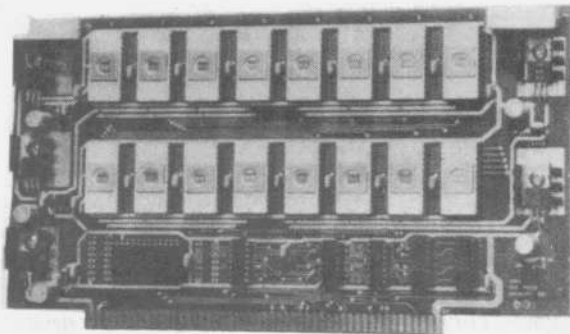
The SBC-100 is a single board microcomputer designed around the powerful Z80 Microprocessor. The board operates on the industry standard S-100 Bus, and may be used with other boards from SD SYSTEMS to build a complete, low cost data processing system.

Provision for up to 8K Bytes of PROM On-Board using 2716 EPROM • 1024 Bytes of Random Access Memory • Serial Input/Output Port with Asynchronous and Synchronous Operation • Parallel Input and Output Ports • Software Programmable Baud Rate Generator • Z80 Central Processing Unit • Four Channel Counter/Timer (Z80-CTC) • Optional Vectored Interrupts • No Front Panel Required for Operation • Auto Start on Reset to any 4K Boundary.

- KIT
- SDSBC100K ..... \$235.95
  - ASSEMBLED AND TESTED
  - SDSBC100A ..... \$359.95



## 16K EPROM



Uses 2708 EPROMS, memory speed selection provided, addressable anywhere in 65K of memory, can be shadowed in 4K increments.

BOARD ONLY

7902 ..... \$ 24.95

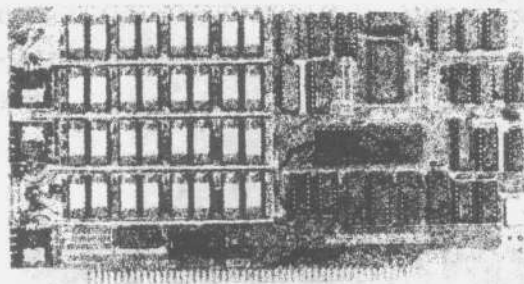
WITH PARTS LESS EPROMS

7902 ..... \$ 49.95

EPROMS

7902A2708 ..... \$ 9.95

## MICROMATION 4MHz Z80A 64K RAM

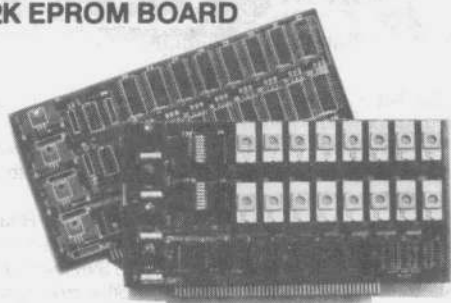


64K Dynamic RAM with transparent refresh • Up to 2K EPROM type 2716, 2708 • Crystal clock • Optional vector interrupts • Power requirements: +8V @ 700ma, +16V @ 200ma, -16V @ 10ma.

ASSEMBLED AND TESTED

MIM264 ..... \$1119.95

## 16K/32K EPROM BOARD

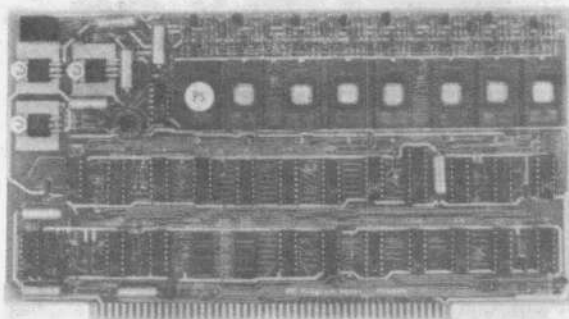


Accepts up to 16 of either 2708 or 2716 EPROMS or compatible ROMS. • Addressable to any 16K boundary: EPROMS addressable by DIP switch to any 1K (2K with 2716) location. • Only EPROMS installed need be enabled. Unused locations may be allocated for RAM. • Selectable wait states: 0, 1, 2, 3, or 4.

ASSEMBLED AND TESTED

AEP16K ..... \$ 84.95

## 8K EPROM (SAVER)



Programs may be directly run from the program saver such as fixed routines or assemblers. • Uses (2708's) • On-board PROM programming • Address relocation of each 4K of memory to any 4K boundary within 64K • Power on jump and reset jump option for "turnkey" systems and computers without a front panel • Program saver software available.

PROGRAM SAVER SOFTWARE IN 2708

7801S ..... \$ 24.95

BOARD WITH PARTS BUT NO EPROMS

7902A ..... \$139.95

WITH 4 EPROMS

7804 ..... \$179.95

WITH 8 EPROMS

7802 ..... \$219.95

BARE BOARD & CUSTOM COIL

7803 ..... \$ 35.95

## MEMORY MANAGER



The Memory Manager board is designed to extend the addressing capabilities of S-100 microcomputers beyond 64K bytes—up to 16M bytes in Mode 1 and up to 512K bytes in Mode 2.

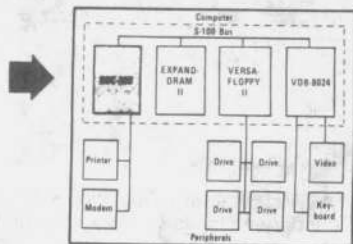
The first mode of operation utilizes one 8 bit out-put port (selectable to any I/O address) to drive the proposed IEEE S-100 extended address lines A16 through A23 for full 24 bit addressing.

The second mode of operation utilizes the same 8 bit output port, but only the 3 least significant bits are used. These feed a 3 line to 8 line decoder which drives one of eight qualifier lines high on S-100 bus pins 59 through 66 to enable Godbout Econoram boards with on-board qualifier capability. This can be used with Econorams IIA, VII (16 and 24K), X, XII (16 and 24K), XIII and Econoram 2708.

ASSEMBLED AND TESTED

GVCK023 ..... \$ 79.95

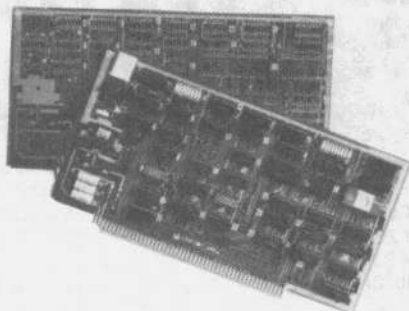
## SBC-200 SINGLE BOARD COMPUTER



Z80 Central Processing Unit • 1024 Bytes of Random Access Memory • 8K Bytes of PROM using 2716 • Serial Input/Output Port (with Asynchronous and Synchronous Operation) • Parallel Input and Output Ports • Four Channel Counter/Timer (Z80-CTC) • Software Programmable Baud Rate Generator • No-Front Panel Required for Operation • 4 MHz Operation.

KIT	
SCSBC200K .....	\$259.95
ASSEMBLED AND TESTED	
SCSBC200A .....	\$384.95

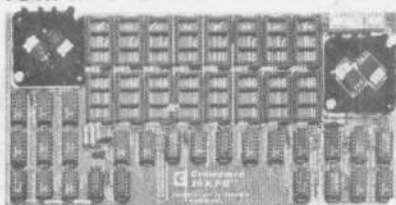
## Z-80 CENTRAL PROCESSING UNIT



On-board 2708 EPROM. • Power-on-jump to any 4K boundary above 32K-RAM. ROM, or the on-board 2708. • Front panel-less operation allowed by on-board run-stop flip-flop and optional generation of MEMORY WRITE. • Selectable wait states on the following cycles: M1 cycle, Memory Request cycle, On-board ROM cycle, Input cycle, Output cycle • Selectable 8080 or Z-80 I/O addressing modes. • DMA Grant tri-states all signals from processor board. • 8224 clock generator provides 8080 like  $\phi 1$  and  $\phi 2$  for the S-100 Bus. • Status signals are latched per S-100 Bus specification. • Processor speed: 2.0 MHz, or 4 MHz. • On Board Memory: One 2708 EPROM.

2 MHz ASSEMBLED AND TESTED	
ACPZ80 .....	\$174.95
4MHz ASSEMBLED AND TESTED	
ACPZ80A .....	\$204.95

## 16K PROM

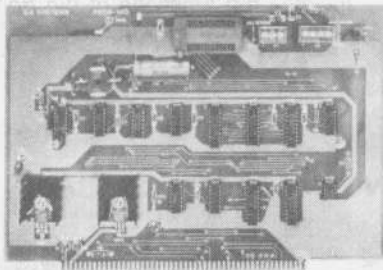


Cromemco's 16K PROM card is ideal when you want the capability for a sizable PROM memory. This card holds up to 16 high-speed, erasable 2708 PROMs. The 16KPR also has Cromemco's powerful bank-select feature and will operate with the fastest microcomputers because of its address anticipation feature. The card is assembled and tested (Model 16KPR-W) PROMs are not included.

Memory Capacity: 16K Bytes • Memory Type: 2708 PROM or equivalent • Memory Access Time: 450 nanoseconds • Wait States at 2 MHz: none required • Wait States at 4 MHz: on non-sequential addresses only. • Operating Environment: 0-55°C.

CROA20055 .....	\$239.95
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## PROM-100 PROGRAMMING BOARD FOR PROM DEVELOPMENT



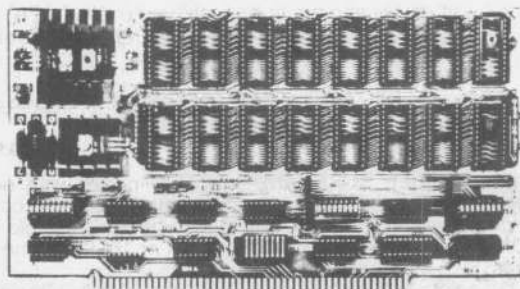
Programs the Following EPROM's: 2708, Intel 2758m 2716, 2732 and Texas Instruments 2516 • Dip Switch Selection of EPROM type • 25 VDC Programming Pulse Generated On Board • Maximum Programming Time: 16,384 Bits in 100 Seconds • Power Requirement: +8 VDC at 300 mA; +16 VDC at 100 mA; -16 VDC at 60 mA • TTL compatible • Software Provides for Reading of Object File from SDOS, CP/M or PROM and Programming into EPROM • Program Verification • Verification of Erasure • Zero Insertion Force Socket.

KIT	
PROM100K .....	\$144.95
ASSEMBLED	
PROM100A .....	\$214.95

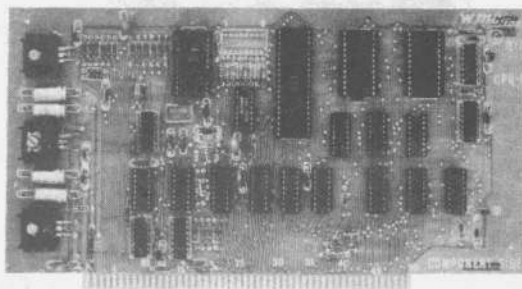
## EXPANDOPROM

Expandable Read Only Memory from 1K to 32K • Each EPROM Dip Switch selectable • Dip Switch for Addressing on 16K/32K boundaries • Dip Switch Selectable Wait States • Interfaces with: SBC-100, SBC-200, MPB-100 and other Z80, 8080 and 8085 CPU boards. The ExpandoPROM's boundaries are 16K and 32K. The PROM chips that are suitable for the ExpandoPROM are the 2708 (1K) and the 2716 (2K). The ExpandoPROM is designed for operation with 8080, 8085 and Z80 based Central Processing Units.

ASSEMBLED AND TESTED	
38010 .....	\$189.95



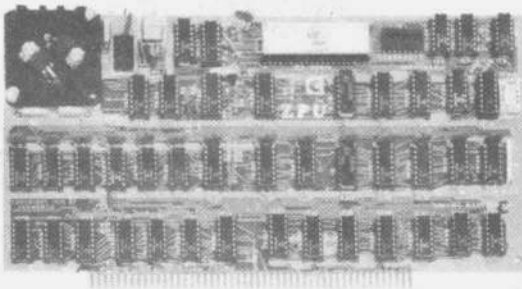
## 8080A CPU (WITH EIGHT LEVEL VECTOR INTERRUPT CAPABILITY)



Uses the 8080A and the 8224 clock chip. The crystal frequency used is 18 MHz and the vector interrupt chip is the 8214. The board will function normally without the interrupt circuitry. When the interrupt circuitry is built up, the board will respond to eight levels of interrupts. Designed to be a plug-in replacement for the IMSAI CPU board and will work in other computers with the appropriate modifications made to the ribbon cable connector pin out from the front panel. The board will work in systems without a front panel if the system has a PROM board that simulates the functions of the front panel.

BARE BOARD	
CPU1	\$ 29.95
WITH PARTS	
CPU1	\$119.95

## CROMENCO 4 MHz Z-80 CPU CARD



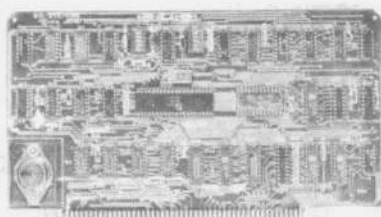
**TECHNICAL SPECIFICATIONS Z-80 MICROPROCESSOR CARD**—4 MHz version of the Z-80. • 2/4 MHz (switch selectable). • 158 instructions including the 78 instructions of the 8080. • POWER-ON JUMP: jumper wire enabled. • POWER-ON JUMP 16 locations switch selectable.

0-4 wait states jumper wire selectable. • M1 WAIT STATE: jumper wire selectable. • POWER REQUIREMENTS: +8 volts @ 1.1A

KIT	
CROK10049	\$289.95
ASSEMBLED	
CROA10049	\$389.95

INCLUDES FREE SOFTWARE—the CPU comes with our powerful Z-80 monitor, complete documentation, source code, and paper tape object code. The monitor is also available in PROM (\$25) for use in our BYTE-SAVER or 16KPR memory boards.

## Z-80 CPU

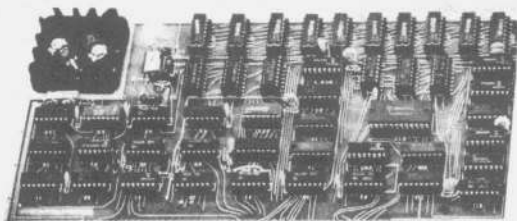


Z80 Microprocessor • 2 MHz or 4 MHz Operation • Power-On Jump to any 4K Boundary • On-Board Socket for up to 2K PROM • Front Panel Usages Optional • Optional Wait States.

**Specifications:** Power Requirements: +8VDC @ .7 AMP max • Read Only Memory: 4K Bytes.

KIT	
SDSKMB100	\$199.95
ASSEMBLED	
SDSAMB100	\$279.95

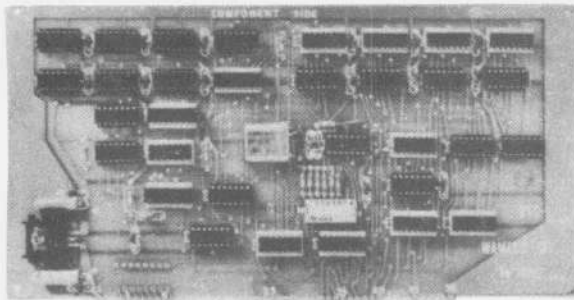
## FLOATING POINT BOARD FOR HIGH SPEED NUMBER CRUNCHING



The North Star hardware floating point board (FPB-A) performs floating point add, subtract, multiply and divide with up to 14 digits of precision. Approximately 25 times faster than the best Z80A software or firmware.

NORTH STAR ASSEMBLED	
NORA30227	\$329.95

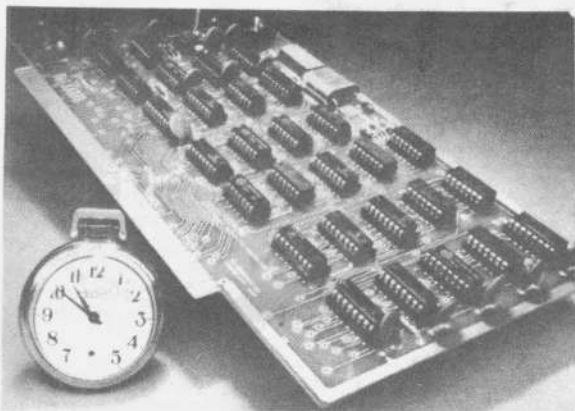
## REAL TIME CLOCK



Uses a 1 MHz crystal on board so it will work anywhere, line frequency is not used as a reference. There are two interrupts that may be generated. Both are set up and selected by software. One is a decade interrupt that steps between 100 microseconds and 100 seconds. The other is a 16 bit counter (LSB is 10 microseconds) that is selectable between 10 microseconds and 655,360 microseconds. The board may be selected by means of any one of 28 device code pairs. An eight page software source listing and a three page flow chart for a Time of Day and Day of Week are included with the documentation. This program uses the one second interrupt but the user can modify the program for use of a faster interrupt if split second accuracy is needed.

BARE BOARD	
RTCI	\$29.95
WITH PARTS (KIT)	
RTCI	\$79.95

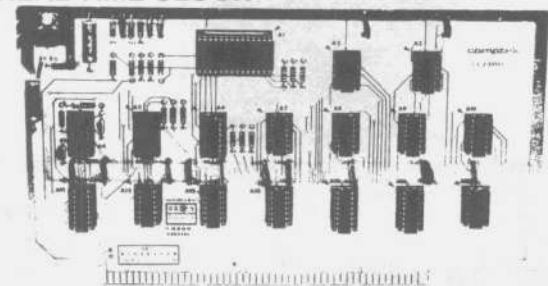
## REAL TIME 100,000 DAY CLOCK



MT. HARDWARE Double the utility of your S-100 bus computer with a real-time clock that keeps time in 100 $\mu$ s increments for over 273 years. Program events for the entire period with real time interrupts...without derailing the system. Maintain a log of computer usage, time and date transaction printouts, call up lists...virtually any activity where time is a factor. On-board battery backup.

**MHPX004** ..... \$249.95

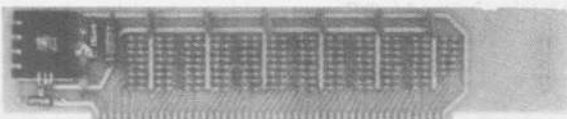
## REAL TIME CLOCK



- Uses 8 sequential I/O ports, user selectable to any of 10 base addresses
- Single BCD digit returned for tens of hours, hours, tens of minutes, minutes, tens of seconds and seconds
- S-100 bus compatible
- Uses highly accurate 60 Hz line frequency as timebase
- +8VDC, 300 ma. (max)
- +16VDC, 50 ma. (max)
- Bus line 64 used for 60 Hz signal
- Output commands for HOLD, SET HOURS, SET MINUTES, Enable/Disable interrupts. Acknowledge/Reset Interrupt, and interrupt rate select
- Six interrupt rates—once each 1 sec, 10 sec, 1 min, 10 min, 1 hour, or twice each day

**CACL2400** ..... \$135.95

## ACTIVE TERMINATOR



**PARTS LIST 900**—94 470 ohm • 1 470 ohm, 1 watt • 2 10uF, 25 Volt • 6 .01 disc • 1 32uF, 6.4 Volt • 1 led • 1 7805 • 1 heat sink. By ELECTRONIC SYSTEMS.

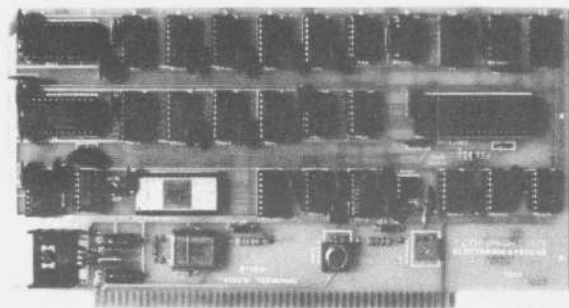
**BOARD ONLY**

**900** ..... \$14.95

**WITH PARTS (KIT)**

**900A** ..... \$24.95

## VIDEO TERMINAL



16 lines, 64 columns • Upper and lower case • 5x7 dot matrix • Serial RS-232 in and out with TTL parallel keyboard input • On board baud rate generator 75, 110, 150, 300, 600, & 1200 jumper selectable • Memory 1024 characters (7-21L02) • Video processor chip SFF96364 by Neculonic • Control characters (CR, LF, →, ←, ↑, ↓, non destructive cursor, CS, home, CL • White characters on black background or vice-versa • With the addition of a keyboard, video monitor or TV set with TV interface (part no. 107A) and power supply this is a complete stand alone terminal • also S-100 compatible • requires +16, & -16 VDC at 100mA, and 8VDC at 1A.

By Electronic Systems.

KIT

**1000A** ..... \$199.95

## ACTIVE TERMINATOR

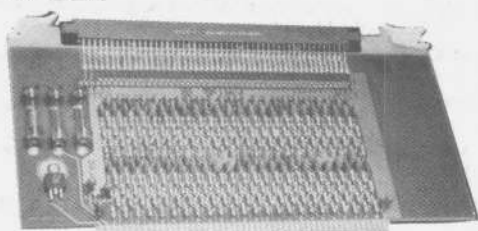


Active termination promotes reliable and accurate data transfer by minimizing the ringing, cross-talk, overshoot, noise and other gremlins that can occur with unterminated lines. Also saves considerable energy compared to passive termination systems, thereby putting less strain on your power supply and keeping heat out of the enclosure. All lines (except power & ground) terminated to 2.7V through 270 ohms.

ASSEMBLED AND TESTED.

**GDCK017** ..... \$ 32.95

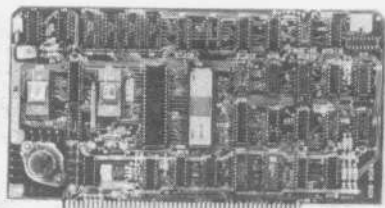
## EXTENDER



**Extender Terminator Kit**—With all lines labelled...power lines fused for added safety...active & dynamic termination... designed to eliminate crosstalk.

**2520A** ..... \$39.95

## VIDEO BOARD



80 Characters × 24 lines—FEATURES INCLUDE: The most versatile Video Display Board on the market today. An on-board Z80 microprocessor is used to control functions, making the VDB-8024 perform as a stand alone terminal • A full 80 characters by 24 lines displayed on the CRT • Keyboard Power and interface are on integral part of the board • On-board 2K Bytes of RAM for character storage • Glitch-free display • A total of 256 user programmable characters available, including 128 characters that are supplied with the board • Full cursor control • Both forward and reverse scrolling • S-100 Bus Compatible interface with "Handshaking" • Variable Display Rate • Field Reverse; Field Protect; Blinking-Underline; Blinking Reverse, all software available on board. Mod. VDB-8024—by S.D. Systems.

KIT ASSEMBLED AND TESTED

SD27001 ..... \$299.95  
SD38013 ..... \$379.95

## PROTOTYPE BOARD



**Tarbell Electronics Model 1010 Prototype Board** • Gold plated edge pins • Takes 33 14-pin ICs or • Mix 40-pin, 18-pin, 16-pin and 14-pin ICs • Location for 5 volt regulator • Suitable for solder and wire wrap.

TAR1010 ..... \$ 29.95

## ASCII/BAUDOT TERMINAL

Ideal for RTTY use—Four user-programmable baud rates are provided: ASCII 110 and 300; BAUDOT 45.45 and 74.2. Crystal controlled 64x16 display of 5x8 dot matrix characters.

**128 CHARACTER SET** Full upper case and lower case alpha, numeric, greek, common symbols, and some special graphics characters are provided by the on-board character generator ROM.

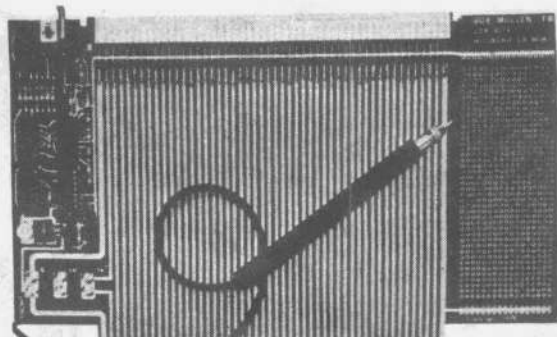
**CURSOR CONTROLS** The SCT-100 provides full cursor control including up, down, left, right, home, screen clear, carriage return, erase to end of line (or page), and direct cursor addressing.

Stand alone device with a parallel keyboard input, it communicates with an external device in a serial format.

ASSEM. & TESTED KIT

SCT100A ..... \$174.95  
SCT100K ..... \$154.95

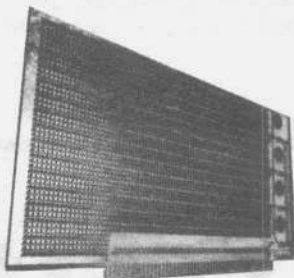
## EXTENDER W/LOGIC PROBE



**Extender Board**—Includes built-in logic probe, great instructions. Allows you to troubleshoot and work on boards outside of the system. Ideal for taking measurements; makes probing the board easy. Includes non-slip type probe. Logic probe indicates H, L, & pulse train w/ 3 different colored LEDs.

GPCK006 ..... \$ 48.95

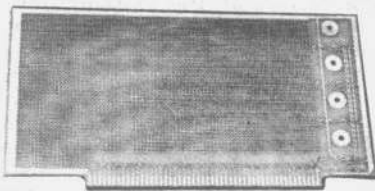
## S100 PROTO BOARDS



**Solder Toll Board**—Accommodates up to 102 16-pin sockets, or 24 40-pin sockets.

2510A ..... \$ 29.95

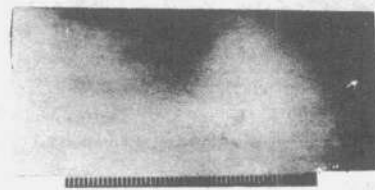
## PROTO BOARDS



**Wire Wrap Board**—Accommodates up to 102 18-pin sockets, or 24 40-pin sockets • By CCS.

2500A ..... \$ 29.95

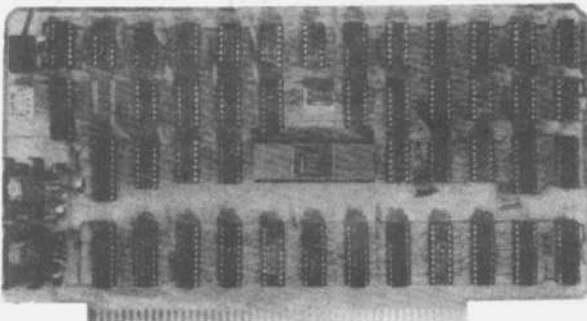
## PROTO BOARDS



**Etch Board**—For etching your own S-100 circuit...½ oz. copper PC board...hard-gold-plate fingers.

2590A ..... \$ 17.95

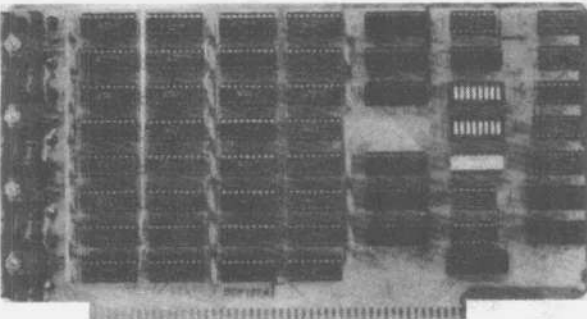
## 8086 POWER WITH 16-BIT WORD LENGTH



Now! for the S-100 bus—8086 CPU—This card brings state-of-the-art performance to the S-100 us. It may be used to upgrade existing 8-bit systems by "swapping" the CPUs or it may form the foundation for a high performance 16-bit system. It will operate with 8-bit, 16-bit, or mixed memory and peripherals. It has a 1-megabyte addressing range. It can be factory upgraded at nominal cost from 4 MHz. to 8 MHz. when the faster CPU chip is available.

2051218086 ..... \$895.95

## CPU SUPPORT CARD



This is a companion to our 8086 CPU. It includes a 2K monitor with machine language debugger and disk bootstrap loader, serial port with software-selected Baud rate, time-of-day clock with battery backup capability, two general purpose timers/counters, and a vectored interrupt controller with 7 interrupts generated on board and 8 accepted from the bus.

205121CPU ..... \$395.95

**Z80/8086 CROSS ASSEMBLER**—This cross assembler runs under CP/M and its derivatives. Its mnemoics are the same as or similar to Intel's ASM-86. it is available in 5" soft-sectored, 5" North Star, or 8" soft-sector (IBM) formats.

20512180 ..... \$249.95

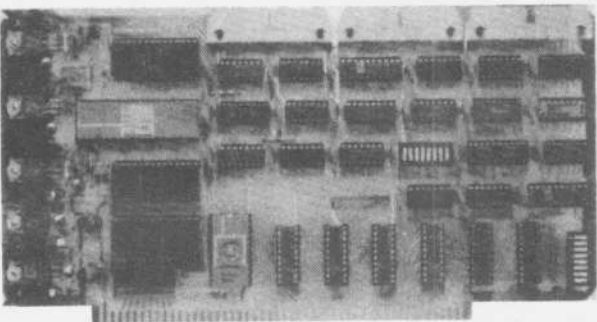
**MICROSOFT BASIC-86**—Microsoft's BASIC interpreter for the 8086 is essentially identical in features to their 5.0 release for the 8080 and is ANSI compatible. It is a "stand-alone" version and includes all disk and terminal I/O drivers. Programs written for any earlier version of Microsoft BASIC will run under BASIC-86 with little or no modification.

20512185 ..... \$329.95

**MCS-86 USER'S MANUAL**—By Intel—Feb., 1979. This is the primary hardware and software reference manual for the 8086 CPU.

205121MCS ..... \$ 6.95

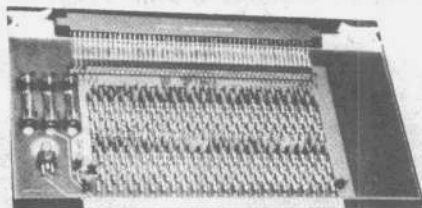
## 8/16 MEMORY CARD



Through the use of the SXTRQ line of the proposed IEEE Standard, this memory board will appear to be 8K by 16 bits to our 8086 CPU or 16K by 8 bit CPUs. It is offered with 250 nsec. memory chips only and will perform without wait states with our 8086 CPU using an 8 MHz. clock. It has 24-bit extended addressing.

20512116 ..... \$595.95

## EXTENDER/TERMINATOR

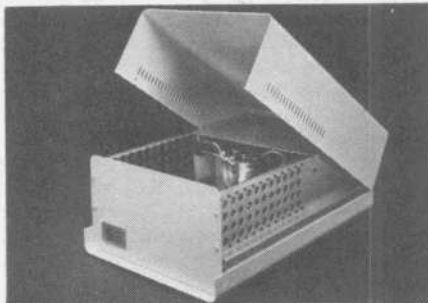


Active and/or dynamic termination • All power lines fused for protection • All S-100 lines labeled and numbered • Can be used as an extender and/or terminator • Solder mask both sides of board • Silkscreen reference designation • Gold plated fingers.

KIT

CCS2520A ..... \$ 39.95

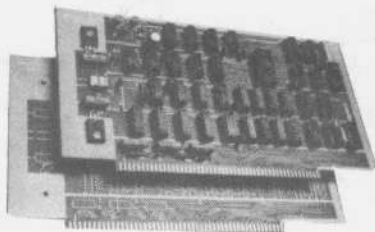
## MAINFRAME



Industrial/commercial quality construction • Flip-top cover • Excellent cooling capability • 12 slot capability (uses model 2501A) • Input 105, 115, or 125 VAC • Output +8VDC at 20A & -16VDC at 4A • Active termination of all bus lines • Fan and circuit breaker included • Rugged construction • All parts available separately. By CCS

CCS2200A ..... \$399.95

## VIDEO DISPLAY BOARD

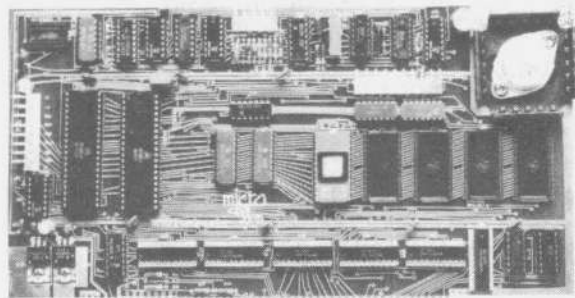


16 lines of 64 characters each. • Full upper/lower case ASCII character set, numbers, symbols, and Greek letters. • Characters are composed of  $7 \times 9$  dot matrix in a  $8 \times 10$  field. • Selectable display modes, normal or reverse video, blinking cursor. • Memory addressable to any 1K page. • Software driver simulates TTY, provides full cursor control (up, down, forward, back, home, and flashing), scrolling and paging. • Compatible with CP/M or Ithaca Audio's K3 Operating System. • All S-100 lines fully buffered.

ASSEMBLED AND TESTED

AUDBT ..... \$145.95

## 6809 SINGLE BOARD COMPUTER



The MD-690b CPU card from MicroDaSys brings the powerful 6809 processor with its 16-bit instructions and internal registers, extended addressing and hardware multiplication to the economical and popular S-100 bus. This single board computer integrates I/O, RAM, PROM, cassette interface and other features in a complete package for instant use.

With the MD-690b you have your choice of two different monitor PROMs. MONBUG II provides the firmware you need to interface to memory-mapped video cards such as the VB1-B and MicroDaSys's new full-color,  $80 \times 24$  ColorMaster video card. RSBUG II enables the user to interface directly to an RS232 terminal using the board's own hardware.

The features of the board include an on-card 2400 Baud (Manchester encoded)/300 Baud (K.C. standard) cassette interface, 1K static RAM, 10K PROM space, RS232 level shifters, an interrupt-driven keyboard input, 20 I/O lines, power-on reset, DMA capability, interrupt handling and real-time clock.

KIT (COMES COMPLETE WITH DOCUMENTATION AND APPLICATION NOTES)

MD690b ..... \$239.95

ASSEMBLED AND TESTED WITH 6502 C.P.U.

MD690 ..... \$299.95

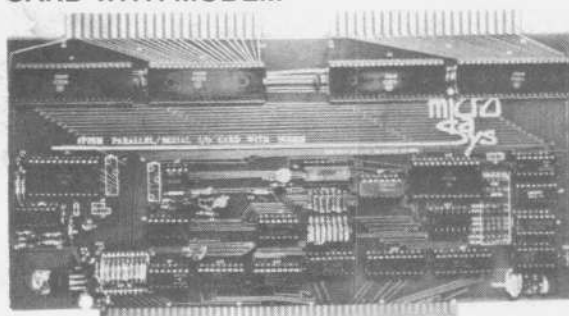
KIT

MD6906602 ..... \$198.95

ASSEMBLED AND TESTED

MD6906602C ..... \$258.95

## MULTI-PURPOSE PARALLEL/SERIAL I/O CARD WITH MODEM



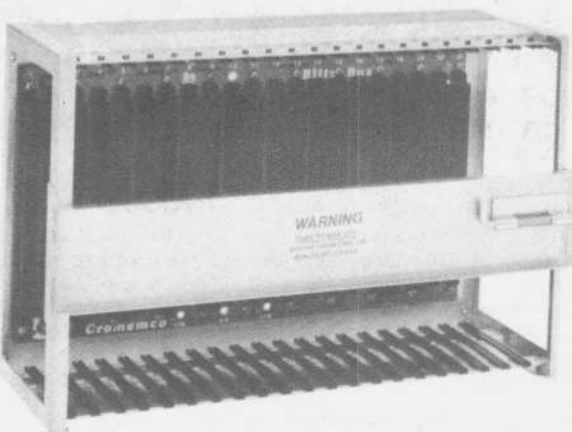
The card provides *eight* parallel bi-directional data ports (64 I/O bits) with full handshaking and interrupt handling (another 16 I/O bits). In addition there are two serial input and output ports. The user can configure one set of serial ports for full RS232 operation, and the other as a full duplex answer or originate MODEM or byte standard cassette interface.

The board can be set up for either memory-mapped or port mapped I/O and will work in any Z-80, 8080, 6800, 6802, 6809, 6502, or 8085 system in the S-100 bus. A complete documentation package is included with the board.

KIT FORM

8P2SMCC ..... \$149.95

## CARD CAGES



Cromemco offers three different S-100 bus card cages. The card cages are a sturdy steel construction and include a rugged retaining bar to insure that cards cannot be shaken from their sockets. The back planes include a full set of edge connectors wave-soldered in place on Cromemco's exclusive shielded mother board. The cages are available in an 8-, 12- or 21 slot version. By Cromemco

DIMENSIONS AND NUMBER OF SLOTS—6-5/8" H 10-7/8" W 7" L, 8 SLOTS

CC8 ..... \$195.95

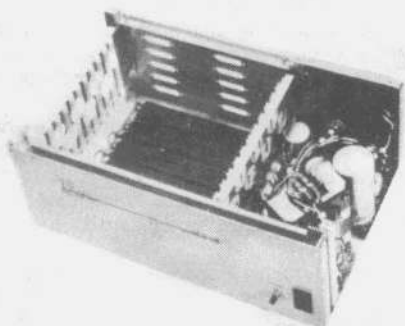
6-5/8" H 10-7/8" W 10-1/4" L 12 SLOTS

CC12 ..... \$245.95

6-5/8" H 10-7/8" W 16-3/4" L, 21 SLOTS

CC21 ..... \$396.95

## TEI MAINFRAMES



A heavy duty, precision formed cabinet of fine craftsmanship. Vented for most efficient thermal characteristics.

**FRONT PANEL**—The front panel is blank except for an indicating AC switch and a reset switch. However, the chassis and mother board are designed so that you may remove the front panel and insert an IMSAI or equivalent front panel.

- **COVER**—Both units are equipped with wrap-around cabinet tops vented on one side for efficient airflow and cooling.

- **MOTHERBOARD**—An S-100 Bus system high quality mother board with 100-pin edge connectors. Compatible with IMSAI, 'MITS, CROMEMCO, TDL and other S-100 bus configured circuit boards. Plug connections for reset switch. Voltage terminals are screw type to power supply leads. All card guides are provided.

**EDGE CONNECTORS**—High quality edge connectors. Completely checked out for shorts or open traces. ALL edge connectors furnished, 12 for the MCS-112 and 22 for the MCS-122.

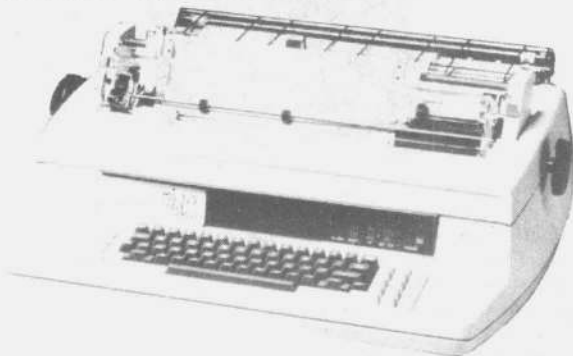
**POWER SUPPLY**—One of a kind...using a constant voltage transformer (CVT) with a very high immunity to input line noise...greater than 100 dB rejection. Line regulation better than  $\pm 1\%$  from an input of 95 to 140 Volt AC at full load to 85 to 140 Volt AC at three quarter load. Designed to meet UL-478 specifications (EDP SPECS). Individual fusing on all input and output voltage lines. See specifications below for power ratings.

**COOLING SYSTEM**—A 115 CFM muffin fan with a commercial grade washable filter will provide clean airflow over all circuitry.

**SPECIFICATIONS—MCS-112:** Dimensions: 17 1/4 W x 12 D x 7 1/4 H • Power +8 volt DC: 17 amps • Power  $\pm 16$  volt DC: 2 amps • Edge Connectors: 12 • Input Power: 115 VAC 60 Hz • (Optional 220 VAC 50 Hz available) • **MCS-122:** Dimensions: 17 1/4 W x 19 1/2 D x 7 1/4 H • Power +8 volt DC: 30 amps • Power  $\pm 16$  volt DC: 4 amps • Edge Connectors: 22 • Input Power: 115 VAC 60 Hz • (Optional 220 VAC 50 Hz available)

DESK TOP—12 SLOT, 60 Hz MOD. MCS-112	
<b>TEI10200</b> .....	<b>\$599.95</b>
MOD. MCS112-50	
<b>TEI10201</b> .....	<b>\$673.95</b>
22 SLOT, 60 Hz MOD. MCS122	
<b>TEI10210</b> .....	<b>\$759.95</b>
50 Hz MOD. MCS122-50	
<b>TEI10211</b> .....	<b>\$799.95</b>
RACK MOUNT—12 SLOT, 60 Hz MOD. RM12	
<b>TEI10220</b> .....	<b>\$669.95</b>
50 Hz MOD. RM12-50	
<b>TEI10221</b> .....	<b>\$699.95</b>
22 SLOT, 60 Hz MOD RM22	
<b>TEI10230</b> .....	<b>\$839.95</b>
50 Hz MOD RM22-50	
<b>TEI10231</b> .....	<b>\$899.95</b>

## THE SYSTEM-Z—WORD PROCESSOR AND BUSINESS SYSTEM



The SYSTEM-Z Word Processor + Business System is the latest fast-typing secretary, careful accountant, efficient order taker, friendly gamesperson, and serious on-line computer system from MicroDaSys.

The SYSTEM-Z features the Z-80 processor, S-100 bus, CP/M Disk Operating System, a full-sized disk drive (standard), 32K RAM, basic printer I/O, a fully encoded ASCII keyboard, CRT video monitor, and software from our extensive software library.

The SYSTEM-Z does it all...it can type your letters and do re-write at over 600 words per minute—you control your printing parameters. Program the system in nearly a dozen languages or use some of the hundreds of off-the-shelf programs MicroDaSys offers for the business, personal and hobbyist user.

The SYSTEM-Z comes with a comprehensive user's guide that explains system set-up. CP/M commands, standard operation, troubleshooting aids as well as hardware specifications.

Many different hardware and software options are available for the system including full-color video graphics display using MicroDaSys's new 80 x 24 ColorMaster video card. hard disks, additional floppy disks and other options can be added to the system using its flexible modular S-100 design and CP/M capabilities.

**ASSEMBLED AND TESTED**  
**SYSZC** .....

**\$2899.95**

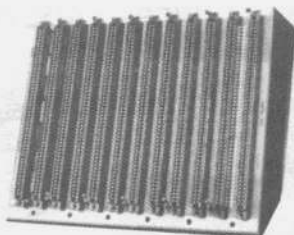
S-100 HARDWARE

MICRODASYS

71



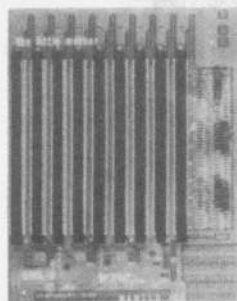
## MOTHER BOARD



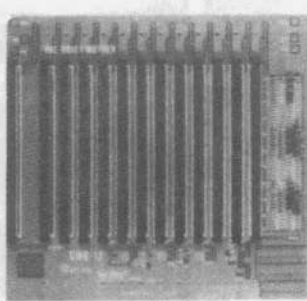
12 slot capability • All 12 S-100 BUS connectors included • Low inductance inter-connects to reduce signal noise and crosstalk • Active termination of all bus lines to further reduce signal noise and line reflections • Distributed bypassing of all power lines • Solder mask both sides of board • Silkscreen of reference designations • Simple strong board mounting • Criss-cross BUS lines both sides of board • All holes plated through • Solder plated circuit area.

KIT	
CCS2501K	\$ 79.95
ASSEMBLED AND TESTED	
CCS2501A	\$119.95

## 9 AND 13 WAMEMCO SLOT MOTHERBOARD



Part No. QMB-9



Part No. QMB-12

## MOTHERBOARD SHIELDED/TERMINATED

A MUST FOR RELIABLE SYSTEM OPERATION!!! These are third generation micro-motherboards set up to exceed the latest S-100 specs. Designed with operation of the newest 5 to 10 MHz MPUs in mind—with any of these motherboards, you won't have to start from scratch when you want to upgrade your system from 2 or 4 MHz.

True active termination—with split termination—half of the termination load at each end of every bus line. Grounded Faraday shield between all bus signal lines to minimize cross-talk. Heavy duty power traces for minimal power loss. Power connectors supplied. All sizes fit Godbout, Vector, Imsai, TEI, etc. enclosures.

All boards are double sided fiberglass epoxy, G10/FR4, with plated through holes and solder mask on both sides.

19 SLOT-PROVIDES SLOT FOR FRONT PANEL. 9" x 17" (APPROX) ASSEMBLED

GDCK024	\$199.95
12 SLOT—9" x 11" (APPROX.) ASSEMBLED	
GDCK025	\$159.95
6 SLOT—9" x 6 1/2" (APPROX) ASSEMBLED	
GDCK026	\$124.95

All traces are reflow solder covered and both sides are solder masked. The connectors used on the boards are the IMSAI™ type (.125" between pins, .250" between rows). Spacing between connectors is .750". All lines, except power and ground, have a passive RC network termination available. There is a kluge area available that will accept two 40 pin sockets and one 36 pin socket. The circuitry for supplying three separate regulated voltages to the kluge area is contained on the board.

BARE BOARD

QMB12	\$ 39.95
KIT	

QMB12	\$ 89.95
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BARE BOARD

QMB9	\$ 34.95
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KIT

QMB9	\$67.95
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## TEI MINI DISK MAINFRAMES

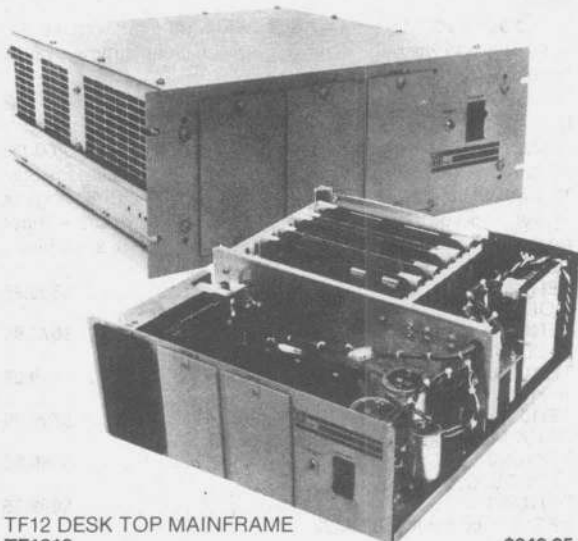
Now—Better than ever with a shielded and actively terminated mother board. **FRONT PANEL**—The front panel provides space for mounting three mini disk drives (Shugart SA400 or equal). An AC switch and a reset switch is also provided.

**MOTHER BOARD**—A 12-slot, S-100 Bus system is provided with 100-pin edge connectors. Compatible with all standard S-100 circuit boards. The mother board is located behind the three drives.

**POWER SUPPLY**—One of a kind...using a constant voltage transformer (CVT) with a very high immunity to input line noise...greater than 100 dB rejection. Line regulation better than  $\pm 1\%$  from an input of 95 to 140 Volt AC at full load to 85 to 140 Volt AC at three-quarter load. Additional voltages are provided for the three mini drives. Power cables are supplied. Data cables are optional.

**Specifications for the TF12/RF12:** Dimensions: 17 1/4 W x 19 1/2 D x 7 1/4 H • Power +8 volts DC: 17 amps • Power  $\pm 16$  volt DC: 2 amps • Edge Connectors: 12 • Input Power: 115 VAC 60 Hz • (Optional 220 VAC 50 Hz available)

**CABINET**—A heavy duty, precision formed cabinet of fine craftsmanship. Vented for most efficient thermal characteristics. TF12 and RF12 mainframe do not include disk drives or circuit boards. These are optional and purchased separately.



TF12 DESK TOP MAINFRAME

TF1212	\$649.95
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RACK MOUNT MAINFRAME

RF1212	\$659.95
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# SS-50 BUS

## GIMMIX

**6800 16K SYSTEMS:** Include Mainframe Cabinet, Mother Board, Power Supply, Fan, Choice of One 30 Pin I/O Card and Cable Choice of Two Filler Plates or Disk Regulator Cards, Documentation, and Manuals. Plus: CPU Board (No Timers), and 16K RAM Unsocketed and without Software CONTROL

**34429** ..... \$1344.95  
THE ABOVE WITH CPU BOARD WITH TIMERS AND FULL FEATURE 16K GHOSTABLE RAM BROAD

**44839** ..... \$1448.95  
**VIDEO BASED SYSTEMS:** When Ordered and installed in Either of the Above: 64 x 16 Video Board Plus GMXBUG V. 2.0 ADD

**20000** ..... \$ 199.95  
80 x 24 VIDEO BOARD (WITHOUT RAM SET) PLUS GMXBUG V. 3.0 ADD

**40000** ..... \$ 399.95  
80 x 24 VIDEO BOARD (FULL FEATURES) PLUS GMXBUG V. 3.0 PLUS THE MANUAL AND DISK FOR PROGRAMMING USER DEFINED CHARACTER SET ADD

**46000** ..... \$ 459.95  
**A PARALLEL KEYBOARD AND A VIDEO MONITOR COMPLETE THE SYSTEM.** No Terminal is Required. We Have Available a 12" Video Monitor, Keyboard, Enclosure, Cables and Connectors

**35000** ..... \$ 349.95  
**6800 MAINFRAME** Includes Chassis, Power Supply, Switches, Fan and Mother Board

**79819** ..... \$ 798.95  
6800/6809 MAINFRAME AS ABOVE, PLUS BAUD RATE GENERATOR ON MOTHER BOARD

**82819** ..... \$ 828.95  
6800/6809 MOTHER BOARD ONLY

**27409** ..... \$ 274.95  
COMPLETE POWER SUPPLY COMPONENTS ONLY

**26894** ..... \$ 268.95  
DISK REGULATOR BOARD

**01891** ..... \$ 18.95  
FILLER PLATES

**01492** ..... \$ 14.95  
CPU NO TIMERS (6800)

**22403** ..... \$ 224.95  
WITH 3 INDEPENDENT SOFTWARE CONTROL—TABLE TIMERS

**28806** ..... \$ 288.95  
I/O BOARDS: 30 PIN SINGLE PORT SERIAL

**08841** ..... \$ 88.95  
30 PIN 2 PORT PARALLEL

**08842** ..... \$ 88.95  
50 PIN 4 PORT SERIAL

**19843** ..... \$ 198.95  
50 PIN 4 PORT SERIAL WITH REGULATORS

**20844** ..... \$ 208.95  
50 PIN 8 PORT PARALLEL

**19845** ..... \$ 198.95  
CABLE SETS

**01895** ..... \$ 18.95  
**MEMORY BOARDS:** 16K WITHOUT SOFTWARE CONTROL AND UNSOCKETED

**29813** ..... \$ 298.95  
16K GHOSTABLE STATCI RAM BOARD

**36816** ..... \$ 368.95  
250NS PARTS ADD

**03200** ..... \$ 32.95  
8K PROM BOARD

**09834** ..... \$ 98.95  
4K PPD PROM BOARD, BURNER AND DUPLICATOR

**19835** ..... \$ 198.95  
EXTENDER BOARD—50 PIN

**02433** ..... \$ 24.95

**VIDEO BOARD:** 64 or 32 x 16

**19871** ..... \$ 198.95  
80 x 24 WITHOUT PROGRAMMABLE CHARACTER SET RAM

**39874** ..... \$ 398.95  
80 x 24 ALL FEATURES

**45876** ..... \$ 458.95  
**SOFTWARE:** GMXBUG MONITORS: 2K VERSION 1—2 2708s

**06854** ..... \$ 68.95  
3K VERSION 2—ON 3 2708s

**08855** ..... \$ 88.95  
3K VERSION 3—ON 3 2708s

**09856** ..... \$ 98.95  
VERSION 1 MANUAL ONLY WITH SOURCE LISTINGS—NO PROMS

**02851** ..... \$ 28.95  
VERSION 2 MANUAL ONLY WITH SOURCE LISTINGS—NO PROMS

**02852** ..... \$ 28.95  
VERSION 3 MANUAL ONLY WITH SOURCE LISTINGS—NO PROMS

**03853** ..... \$ 38.35  
PROGRAM TO CREATE USER DESIGNED CHARACTERS MANUAL & DISK

**02061** ..... \$ 20.95  
**VIDEO BASED PACKAGES for Upgrading Your Existing SS50 Bus Computer—Please Specify When Ordering What Brand System and DOS, if any, You Have.** 64 x 16 VIDEO BOARD, GMXBUG V. 1.0 ON AN 8K PROM BOARD

**34817** ..... \$ 348.95  
64 x 16 VIDEO BOARD, GMXBUG V. 2.0 ON A CPU BOARD (NO TIMERS)

**48727** ..... \$ 487.95  
FOR TIMERS ON CPU BOARD

**06000** ..... \$ 60.95  
80 x 24 VIDEO BOARD (WITHOUT RAM SET), GMXBUG V. 3.0 ON AN 8K PROM BOARD

**53837** ..... \$ 538.95  
80 x 24 FULL FEATURES VIDEO BOARD, GMXBUG V. 3.0 ON AN 8K PROM BOARD, PLUS THE MANUAL AND DISK FOR PROGRAMMING USER DEFINED CHARACTERS

**59847** ..... \$ 598.95  
TO SUBSTITUTE GMXBUG V. 3.0 ON A CPU (NO TIMERS) IN PLACE OF AN 8K PROM

**09800** ..... \$ 98.95  
FOR TIMERS ON THE CPU BOARD

**06000** ..... \$ 60.95  
POWER CONTROL BOARDS—CONTACT GIMIX FOR PRICING ON COMPLETE TURNKEY GHOST SYSTEMS WITH REAL TIME SOFTWARE. **RELAY DRIVER PACKAGE** ASSEMBLED AND TESTED WITH 31 RELAYS, BRACKET AND TRANSFORMER

**84808** ..... \$ 848.95  
RELAY DRIVER BOARD ONLY

**44886** ..... \$ 448.95  
BRACKET

**03821** ..... \$ 38.95  
TRANSFORMER

**01424** ..... \$ 14.95  
**OPTO ISOLATED INPUT BOARD** 34 SWITCH CLOSURES

**34885** ..... \$ 348.95  
16-BUTTON REMOTE 2-WIRE KEYBOARD SYSTEM

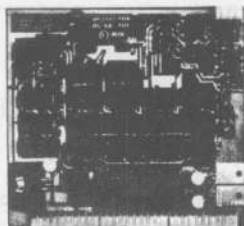
**09883** ..... \$ 98.95  
KEYBOARD

**24884** ..... \$ 98.95  
TONE RECEIVER BOARD

**11882** ..... \$ 118.95  
35 BUTTON SERIAL KEYBOARD—WOOD LAMINATE, BLACK, WHITE OR WALNUT

**12882** ..... \$ 128.95  
35 BUTTON SERIAL KEYBOARD—CLEAR OR SMOKE ACRYLIC

## DS-68 DIGISECTOR



The Micro Works Digisector® is a random access video digitizer; its resolution and speed are unmatched in industry and the price is unbeatable anywhere. The Digisector and an inexpensive TV camera are all you'll need to see eye to eye with your 6800. Since operation is straightforward, you don't have to be a software wizard to utilize the Digisector's extensive capabilities. The Micro Works Digisector board provides the following exclusive features: High Resolution—a 256 x 256 picture element scan • Precision—64 levels of grey scale • Speed—conversion times as low as 3 microseconds per pixel • Versatility—accepts either interlaced (NTSC) or non-interlaced (industrial) video input. • Compactness—utilizes 1 I/O slot in your SWTPC 6800 or equivalent • Economy—a professional tool priced for the hobbyist.

Operation is simple; the computer sends the Digisector two 8 bit addresses (X and Y coordinates), and the Digisector returns the digitized brightness of the image at the specified location. For set-up and monitoring purposes the Digisector also produces an output, comprised of the camera's video signal plus a superimposed intensified cursor, showing exactly where the Digisector is looking.

The software supplied will digitize one pixel every other horizontal scan line, filling 16K of memory with a 6 bit grey scale value per byte in a little less than four seconds. This provides a spatial resolution of 128 by 128 elements, optimum for computer portraiture and slow scan TV. The software drives a Malibu Design Group Model 160 graphics line printer, and is fully commented to ease interfacing to other printers.

Applications include precision security systems, moving target indicators, computer portraiture, and fast to slow scan conversion for ham operators. With clever software, the Digisector can read paper tape, punch cards, strip charts, bar codes, musical scores...just about anything. Give your computer the gift of sight!

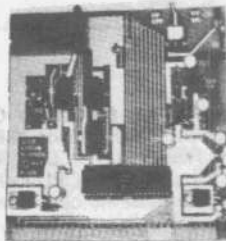
DS68	.....	\$169.95
REGULATED +12		
DS68R	.....	\$179.95

## U2708

All software routines necessary to test, burn verify and copy 2708 EPROMs are available on either 2708 EPROM or cassette tape from The Micro Works. EPROMs may be ordered in two versions. The FC00<sub>16</sub> version is designed for use in the Micro Works PROM System Board (PSB-08) with a monitor PROM at E000<sub>16</sub>, such as SMARTBUB®, RT-68 or a custom monitor. The C000<sub>16</sub> version will operate in a PSB-08 located at C000<sub>16</sub> utilizing the stock MIKBUG® monitor and scratch pad on the CPU board. All versions contain the MIKBUG®/SMARTBUB® restart vectors in the top 8 locations and drive a B-08 located in I/O slot 4. The cassette version starts at location 1000<sub>16</sub> and runs in RAM calling several routines in MIKBUG®.

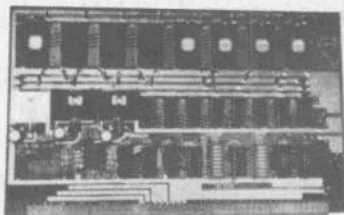
U2708/C000 or U2708/FC00	.....	\$ 29.95
KC STANDARD 300 BAUD CASSETTE TAPE		
U2708/1000	.....	\$ 9.95

## B-08 2708 EPROM PROGRAMMER



The Micro Works B-08 is a compact 2708 EPROM programmer that fits in a standard SWTPC 6800 I/O slot. A safety switch and LED indicator provide control over the high programming voltage generated on the board. An industrial quality Textool zero-insertion-force socket and extended board height allow effortless PROM insertion and retrieval. Fully commented source listings of the versatile Micro Works U2708 PROM Utility software are included, allowing quick and reliable programming and copying of 2708s. An optional +12 volt regulator is available.

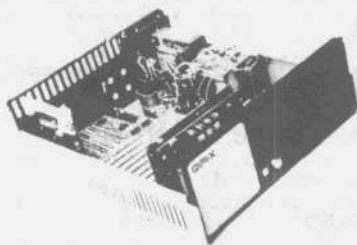
B08	.....	\$ 99.95
REGULATED +12		
B08R	.....	\$104.95

MICROWORKS  
PSB-08 PROM SYSTEM BOARD

The Micro Works PROM System Board features 1K of high speed (350ns), low power RAM and space for up to 8 2708 EPROMs, both DIP-switch addressable to start on any 8K boundary in memory. The exclusive I/O locations up to any unused 1K block in the EPROM memory space. This permits memory expansion to a full 56K of contiguous user RAM, and optional +12 volt regulator can be installed for systems incorporating the Smoke Signal Broadcasting PS-1 power supply or its equivalent.

EPROMS NOT INCLUDED		
PSB08	.....	\$119.95
REGULATED +12		
PSB08R	.....	\$124.95

## THE CLASSY CHASSIS



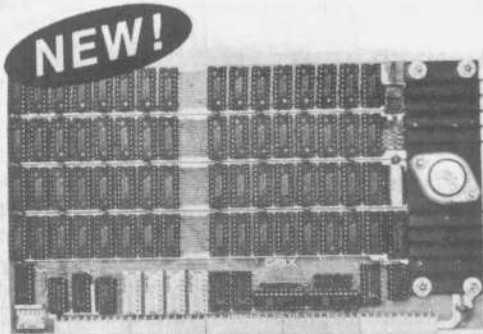
THE CLASSY CHASSIS		
79819	.....	\$798.95
WITH BAUD RATE GENERATOR ON MOTHER BOARD		
82819	.....	\$828.95

## DM-85 DISK MIXER

The DM-85 Disk Mixer is an add-on board for the Smoke Signal Broadcasting BFD-68A Disk Controller which allows operation of both 8" and 5" drives. Controller mode (8" or 5") is selected on a drive-by-drive basis, so any mix of 5" and 8" drives is allowable. The 2 x 3" PC board mounts inconspicuously on the back of the BFD-86A. Its operation is completely transparent to software. An oscilloscope is required for the setup procedure.

**DM85MW** ..... \$ 39.95

## STATIC RAM

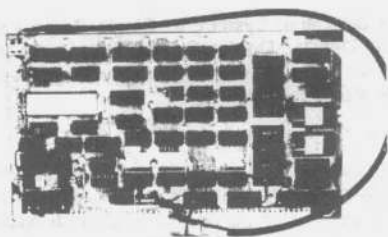


Decoding for 4 Extended Address Lines (allows memory decoding up to 1 megabyte) • DIP-switch to set extended addressing or disable it • 4 separate 8K blocks, addressable to any 8K boundary by DIP-switch • Each 8K block may be individually disabled • Write protect either of two 16K sections • Low power consumption—uses 2114L low power RAMS—(2 amps typical for 32K) • Fully Socketed • Gold Bus Connectors Assembled, Burned In and Tested at 2 MHz by GIMIX.

16K AND 24K VERSIONS ARE SOCKETED FOR 32K AND REQUIRE ONLY ADDITIONAL 2114S FOR EXPANSION. (16K)

<b>32812</b> .....	<b>\$328.95</b>
24K	
<b>43814</b> .....	<b>\$438.95</b>
36K	
<b>54815</b> .....	<b>\$548.95</b>

## 80 x 24 VIDEO BOARD



Upper and Lower Case with Decoders • Hardware Scrolling • Contiguous 8 x 10 Character Cells • X-Y Addressable Hardware Cursor • A user programmable RAM character generator. Custom character sets, up to 128 characters each, can be stored and loaded into the board **under software control**, from disk, tape, ect. • The ability to choose, **under software control**, 256 displayable characters from 384 available in the 3 on board (2 EPROM and 1 RAM) character generators. • The ability to divide the 256 displayable characters into 8 groups, according to **both** ASCII Code and bit 8; lets your program determine how each group is displayed. (Which character generator to use, and whether it will be normal or inverse video, full or reduced intensity or a combination of these.) • GHOST ability: to place multiple boards at the same address and access them individually without affecting the display of the other boards. • The ability to control all these features, on the fly, through software. Fully decoded, occupies only 2K of address space. Fully socketed—Gold bus connectors. Assembled, Burned in, and Tested at 2 MHz

<b>DELUXE VERSION WITH RAM CHARACTER GENERATOR</b>	
<b>45876</b> .....	<b>\$458.95</b>
<b>WITHOUT RAM CHARACTER GENERATOR</b>	
<b>39874</b> .....	<b>\$398.95</b>
<b>ALSO AVAILABLE...64 or 32 x 16 VIDEO BOARD</b>	
<b>19871</b> .....	<b>\$198.95</b>

# SOFTWARE, MISCELLANEOUS

## SD SYSTEM'S COMPATIBLE SOFTWARE

**CP/M Disk Operating System (Single Sided Diskettes)** A modified version of CP/M (By Digital Research of Pacific Grove, California) for use with SDS-100 series and Versafloppy applications. Supplied on both 5" and 8" diskettes.

**39001** ..... \$ 99.95

**CP/M Disk Operating System (Double Sided Diskettes)** Same as 39001, but also includes C-Basic on diskette. Supplied on Double Sided 8" Diskettes.

**39002** ..... \$199.95

**Versafloppy Control Software (BIOS)** For use with Versafloppy controlled disk based computer systems not using SD Systems SBC-100 CPU. Operates with 8080, 8085 and Z80 CPU's starting at address F000H. Contains Format, Read and Write routines, as well as Bootstrap. Supplied in 2708 PROM.

**39003** ..... \$ 35.95

**Versafloppy Diagnostic Software (VDIAG)** Diagnostic Software for Versafloppy (38005, 27002) boards used without SBC-100 CPU. Operates with 39003 (BIOS) VDIAG is compatible with 8080, 8085 and Z80 CPU's. Simulates actual disk usage and reports error conditions. Supplied in 2708 PROM.

**39004** ..... \$ 35.95

**SD Monitor for SBC-100 with RS-232 Terminals** The SD Monitor is control software and monitor for the SBC-100 with RS-232 Interface Terminals. Allows examination and modification of ports, memory and Z80 registers, single stepping, breakpoints and disk functions. Supplied in 2316 ROM.

**39006** ..... \$ 49.95

**SD Monitor for SBC-100 with VDB-8024** Similar to 39006, except for SBC-100 systems utilizing the VDB-8024 Video Display Board.

**39007** ..... \$ 49.95

## SD SYSTEM'S COMPATIBLE CONT'D

**SDOS Disk Operating System, 8" Single Density** Similar to 39027. Single Density, Double Sided, for use with VDB-8024 consoles. Also included is C-Basic II package (see 39014). Operating System for SDS-100.

39031 ..... \$299.95

**SDOS Disk Operating System, 8" Double Density** Similar to 39027. Double Density, Double Sided 8" diskettes for use with VDB8024 consoles. Also included is C-Basic II package (see 39014). Operating System for SDS-200.

39032 ..... \$225.95

**Wordmaster With Tex-Writer** Wordmaster provides a complete word processing system. Coupled with a screen-oriented text editor providing users with excellent editing controls. Operates with SDS-100 and SDS-200 computers.

39033 ..... \$225.95

**Disk Control Software (DBIOS)** For use with SBC-100/Versafloppy combinations using 5" minidiskettes drives and an RS-232 console.

39008 ..... \$ 65.95

**Disk Control Software (DBIOS)** For use with SBC-100/Versafloppy combinations using 5" minidiskettes and the VDB-8024 Video Display Board.

39009 ..... \$ 65.95

**Disk Control Software (DBIOS)** Similar to 39008, except for use with 8" drives.

39010 ..... \$ 65.95

**Disk Control Software (DBIOS)** Similar to 39009, except for use with 8" drives.

39011 ..... \$ 65.95

**Versafloppy Diagnostic Software (VDIAG 2)** Diagnostic software for SBC-100/Versafloppy combinations. Either single or double sided drives and either RS-232 or VDB-8024 consoles. Operates with 39008, 39009, 39010 and 39011 DBIOS.

39012 ..... \$ 65.95

**C-Basic** Comprehensive commercially oriented compiler and interpreter. Converts user source language into intermediate file and from intermediate file into machine language. Supplied on 5" and 8" diskettes.

39013 ..... \$125.95

**Z80 Global Package** Includes SD Text Editor. Z80 Relocating Global Assembler and Linker. Used as a development tool for the sophisticated assembly language programmer.

39014 ..... \$ 99.95

**General Ledger** Pick up copy for all the Business Software from sheet attached. This will carry from 39015 through 39025.

39015 ..... \$499.95

**SDOS Disk Operating System 8" Single Density** Same as 39027 except that is supplied on 8", single sided, single density diskettes.

39029 ..... \$199.95

**SDOS Disk Operating System, 8" Single Density** Same as 39027 except that is supplied on 8", single sided, single density diskettes for use with VDB-8024 console.

39030 ..... \$199.95

## MOTOROLA 6809 EMULATOR

E6809 is a 6800 machine language program that will emulate the operation of Motorola's new 6809 micro-processor chip on a 6800 system. 6809 object code may be placed in the 6800's memory and executed or single-step traced by E6809. Console I/O routines and a built-in mini-monitor facilitate use. A completely commented source listing is included. E6809 is available on: Smoke Signal Broadcasting or FLEX™ disk, or KCS cassette.

E6809 ..... \$ 49.95

## COMPUTER PORTRAIT SYSTEM PACKAGE

## FOR MICROWORKS DIGISECTOR MODEL DS-68

BIOPIC software package produces full page printed portraits from a television image using The Micro Works' Digisector (Model DS-68). Portraits may be printed normally or with left-right reversal (for T-shirt application), and may include a block letter caption. Biorhythm charts may also be produced with this software, which drives a Malibu 160 printer. BIOPIC is supplied in 3 2708 EPROMs; operator's manual is included.

DS68 ..... \$175.95

## U2708 EPROM PROGRAMMER UTILITY

U2708 provides the user with a variety of functions useful for burning, verifying and copying 2708 EPROMs using The Micro Works' 2708 EPROM Programmer card (Model B-08). Commands supported are: BURN, VERIFY, ERASE TEST, BLOCK MOVE, BLOCK SET, EPROM READ, and TAPE LOAD WITH OFFSET. The source listing is supplied in the B-08 Owner's Manual. U2708 is available in 2708 EPROM at FC00, C000, and 1000 (on cassette).

U2708 ..... \$ 29.95

## PRINTER DRIVE FOR MALIBU 160 PRINTER

MPRINT contains all the routines necessary to utilize the capabilities of the Malibu Design Group Model 160 line printer on a SWTPC 6800 microcomputer. These routines provide, among other things, bidirectional printing, full logic seeking, upper and lower case type fonts and normal or 2X expanded characters, all at the blazing speed of 165 characters per second.

2708 ..... \$ 39.95

## BATTER UP!!: A MICROBASEBALL GAME

Features an action-packed game of classic baseball with 3 levels of display. It tests your reaction time and logic.

PET

02801 ..... \$ 9.95

TRS-80 LEVEL II

02803 ..... \$ 9.95

**SARGON: A COMPUTER CHESS PROGRAM**

Features the complete program that won the 1978 West Coast Computer Faire Tournament.

TRS-80 LEVEL II	
00603	\$ 19.95
APPLE II (24K)	
00604	\$ 19.95

**HOW TO BUILD A COMPUTER-CONTROLLED ROBOT**

Features 5 control programs for a computerized robot: joystick control, self-direction, impact sensor control, ultrasonic detection, and voice recognition.

00100KIM	\$ 14.95
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**THE FIRST BOOK OF KIM—TAPE 1**

Features these 14 recreational programs: Addition, Asteroid, Bagels, Bandit, Blackjack, Bitz, Black Match, Card Dealer, Chess Clock, Clock, Code Test, Craps, Duel, and Farmer Brown.

00700KIM	\$ 9.95
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**THE FIRST BOOK OF KIM—TAPE 2**

Features these 14 recreational programs that are not on TAPE 1: Hi-Lo, Horserace, Key Train, KIM Nim, KIM-Tac-Toe, Lunar Lander, Multi-Maze, Music Box, Ping-Pong, Quick, Reverse, Teaser, Timer, and Wumps.

00800KIM	\$ 9.95
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**THE FIRST BOOK OF KIM—TAPE 3**

Features these 13 utility and diagnostic programs that are not on the above KIM tapes: Branch, Browse, Directory, Hypertape, Memory Test, Mini Dis, Movit, PLL Set, Relocate, Sort, Super Dup, Verify Tape, Vu Tape.

00900KIM	\$ 9.95
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**BACKGAMMON**

Features the popular game that can now be played between you and the preprogrammed player Brutus. An accompanying guide contains complete instructions.

PET	
02501	\$ 9.95
TRS-80 LEVEL II	
02503	\$ 9.95

**GAME PLAYING WITH BASIC—TAPE 1**

Features 10 recreational and educational programs: Coin Toss, Coin by Coin, Coin Toss with Summary, Rolling One Die, Rolling Two Dice, Seven/Eleven, Mouse in a Maze, A Random Walk, Battle of the Numbers, Dealing a Poker Hand, and Tic-Tac-Toe.

PET	
00201	\$ 9.95
TRS-80 LEVEL I	
00202	\$ 9.95
TRS-80 LEVEL II	
00203	\$ 9.95
APPLE II	
00204	\$ 9.95

**GAME PLAYING WITH BASIC—TAPE 2**

Features 9 programs: Knight's Tour, Guess the Number, Prime Numbers 1, Prime Numbers 2, Chinese Remainder Theorem, Perfect Numbers, Fibonacci Numbers, Square Numbers, and Armstrong Numbers.

PET	
00301	\$ 9.95
TRS-80 LEVEL I	
00302	\$ 9.95
TRS-80 LEVEL II	
00303	\$ 9.95
APPLE II	
00304	\$ 9.95

**GAME PLAYING WITH BASIC—TAPE 3**

Features these 8 programs: Slot Machines, Blackjack, Roll the Dice, Tower of Hanoi, 15 Puzzle, Buried Treasure, Odd Cell Magic Square, and 4x4 Magic Square.

PET	
00401	\$ 9.95
TRS-80 LEVEL II	
00403	\$ 9.95
APPLE II	
00404	\$ 9.95

**GENERAL MATHEMATICS—1**

Features these 15 programs: Log to Any Base, New Coordinates, Rectangular Polar Coordinates, Permutations, Vector Cross-Products, Max/Min Locator, Number Rounder, Dimension Scaler, Histogram, Circle Finder, Nth Root of a Number, Normally Distributed Random Numbers, and Rational Fractions.

TRS-80 LEVEL II	
01103	\$ 14.95
APPLE II	
01104	\$ 14.95

**ENGINEERING MATHEMATICS—1**

Features these 8 programs: Solving Simultaneous Equations, Evaluation of a Polynomial, Quadratic Equations, Integration by Simpson's Rule, Newton-Raphson Roots, Derivative of a Function, Factorial of a Given Number, and Extended Factorial Calculation.

TRS-80 LEVEL II	
01303	\$ 14.95
APPLE II	
01304	\$ 14.95

**PROGRAMS FOR THE HOME****DAILY BIORHYTHM PROGRAM** by John Augustowski (M.H.S.)

Enter the present date and your birthdate and this program will tell you how long you have lived (days). It then goes on to tell you what day of your physical, emotional and intellectual cycles you are in, after which it gives you a level (+10 to -10) on each of these with an announcement of critical days. All of this is done using a very interesting display format. Finally, the program goes on to display a graph centered on the present date and showing each cycle from 16 days in the past to 15 days into the future. This program comes with a manual giving the history and use of Biorhythms.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K	
T3H101	\$ 7.95
PET VERSION—8K	
P2H0101	\$ 7.95
APPLE II VERSION—16K	
A2H101	\$ 7.95

## PROGRAMS FOR HOME CONT'D

**DIET PLANNING PACKAGE** by Tim Quinlan (M.H.S.) A four program package to help you plan a diet and stick to it. Program "A" computes what your weight should be (adult) and how many pounds you should lose. Program "B" computes your basal metabolic rate, the number of calories you need based on your daily activities and the number of calories you are allowed to lose in pounds a weeks. It finishes by giving you your daily caloric intake to maintain your new weight. Program "C" will help you keep track of your diet and Program "D" helps you plan your meals by giving you the amount of calories, fat, carbohydrates and protein in over 100 foods. This package is a must for planning a sensible weight loss program.

TRS-80 VERSION—LEVEL II/16K	
<b>T2H103</b> .....	<b>\$14.95</b>
TRS-80 VERSION—LEVEL II/16K-W/DISK	
<b>T4H103</b> .....	<b>\$24.95</b>
PET VERSION—8K	
<b>P2H103</b> .....	<b>\$14.95</b>
APPLE II VERSION—16K	
<b>A2H103</b> .....	<b>\$14.95</b>

**PERSONAL FINANCE PACKAGE** by Tim Quinlan (M.H.S.) This package contains three programs to aid you in handling your personal finances. The first is a Checking Account Program to help you keep track of checks, deposits, interest, charges, transfers, etc., along with computing your balance. It has a lot of nice features, including a fast method of data retrieval. The second program helps you keep track of your Budget and the final program Computes Interest on loans, mortgages and charge accounts.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K	
<b>T3H102</b> .....	<b>\$ 9.95</b>
PET VERSION—8K	
<b>P2H102</b> .....	<b>\$ 9.95</b>
APPLE II VERSION—16K	
<b>A2H102</b> .....	<b>\$ 9.95</b>

**SOLARIA** By Tim Quinlan (M.H.S.) A Fantasy Economic Simulation much like Magic Isle. In this version the format is much more sophisticated. There are more decisions to be made and graphic displays have been added. There are tens of thousands of possible lines of output. This game will always prove challenging and entertaining, no matter how many times its played.

TRS-80 VERSION—LEVEL II/16K	
<b>T2G107</b> .....	<b>\$14.95</b>
APPLE II VERSION—16K	
<b>T2G107</b> .....	<b>\$14.95</b>

**BRIDGE CHALLENGER** by George Duisman (P.S.) If you like to play bridge but have trouble getting four people together to play, or you'd just like to practice a little to improve your play, this program is for you. With Bridge Challenger, you an the dummy play against the computer in regular contract bridge. You can let the computer deal or set up hands for study and practice play and save them on cassette. Standard bridge notation like that found in books and newspaper columns is used to help you analyze the hands. Complete instructions including an introduction to bridge for the novice, are included in six pages of documentation. Also included on the same cassette in a 3D tic-tac-toe.

TRS-80 VERSION—LEVEL II/16K	
<b>T2G110</b> .....	<b>\$14.95</b>
PET VERSION—8K	
<b>P2G110</b> .....	<b>\$14.95</b>
APPLE II VERSION—16K	
<b>A2G110</b> .....	<b>\$14.95</b>

**R/T LUNAR LANDER** by Tim Quinlan (M.H.S.) This is a REAL-TIME LUNAR LANDER simulation, featuring movement in four directions. If you don't act fast enough—you'll crash! Uses interesting graphic display.

TRS-80 VERSION—LEVEL II/16K	
<b>T2G108</b> .....	<b>\$ 7.95</b>
PET VERSION—8K	
<b>P2G108</b> .....	<b>\$ 7.95</b>

**MICROCHESS** by Peter Jennings (P.S.) Now you can play chess against the computer! Microchess is a machine language program available in APPLE, PET and TRS-80 versions. It displays a graphic chessboard and even flashes the piece on which the computer narrows its attention prior to making its move. This program offers three levels of play to challenge all players from beginners to real chess enthusiasts.

TRS-80 VERSION—LEVEL I/4K LEVEL II/4K	
<b>T3G109</b> .....	<b>\$19.95</b>
PET VERSION—8K	
<b>T2G109</b> .....	<b>\$19.95</b>
APPLE II VERSION—16K	
<b>A2G109</b> .....	<b>\$19.95</b>

**STIMULATING SIMULATIONS** by Dr. C. William Engel (P.S.) Here is a set of ten original simulation games. The games are fun and the 64 page paperback book which accompanies the cassette, giving instructions, flowcharts, program listings and suggested modifications, makes Stimulating Simulations an educational tool too. The simulations are Art Auction, Monster Chase, Lost Treasure, Gone Fishing, Space Flight, Forest Fire, Nautical Navigation, Business Management, Rare Birds and Diamond Thief.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K	
<b>T3G111</b> .....	<b>\$14.95</b>
PET VERSION—8K	
<b>P2G111</b> .....	<b>\$14.95</b>
APPLE II VERSION—16K	
<b>A2G111</b> .....	<b>\$14.95</b>

**GALACTIC BLOCKADE RUNNER** by Tim Quinlan (M.H.S.) You are the captain of a federation starship battle cruiser. Your mission is to run an enemy blockade and to deliver vital supplies to federation forces under siege on Planet M/5. You control your ship's course and speed along with the firing of its weapons. You will have to fight battle after battle successfully to reach your destination. Besides the enemy, you will have to cope with ship malfunctions and ion storms.

This is a sophisticated game providing ship status reports, sensor scans and graphic displays of the enemy ship, weapons tracks and shield hits. It also displays appropriate warnings and messages. You'll find this game faster paced and more challenging than many of the star treks on the market.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K	
<b>T3G101</b> .....	<b>\$ 7.95</b>
PET VERSION—8K	
<b>P2G101</b> .....	<b>\$ 7.95</b>
APPLE II VERSION—16K	
<b>A2G101</b> .....	<b>\$ 7.95</b>

**DEMO PROGRAM** by Tim Quinlan (M.H.S.) This is a great program for showing off your computer. It emulates museum computer exhibits. Chatty and personal, it plays several games and gives a math test in addition, subtraction, multiplication and division, with a score when finished. The games it plays are Guess My Number, Craps and Tic-Tac-Toe.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K	
<b>T3G103</b> .....	<b>\$ 7.95</b>
PET VERSION—8K	
<b>P2G103</b> .....	<b>\$ 7.95</b>
APPLE II VERSION—16K	
<b>A2G103</b> .....	<b>\$ 7.95</b>

**GRAPHIC GAMES-3**

**(4 Games).** In TANK ATTACK seek and destroy enemy guns hidden among houses and trees before they get you. DODGEM—try to get your pieces across the board first. FREE FOR ALL—airplane, ship, and submarine vie for each other. HIDDEN MAZE—find your way through an invisible maze. OSI CHALLENGER IP & SUPERBOARD II

**01G146** ..... \$ 7.95

**SCI-FI SAMPLER** by Tim Quinlan (M.H.S.) There are three games in this one program. The first is Star Monster, a hidden monster game. The second is a Lunar Lander simulation, where you can enter the starting values or have the computer do it for you. The third is Space Battle, a space war program where you fight a battle with lasers against an attacking enemy space ship. All of these games include instructions as part of the program along with graphic displays.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K

**T3G102** ..... \$ 7.95

PET VERSION—8K

**P2G102** ..... \$ 7.95

APPLE II VERSION—16K

**A2G102** ..... \$ 7.95

**OTHELLO III** by Tim Quinlan (M.H.S.) At strategy game played on an eight by eight board. The object of the game is to capture as many of the squares as possible. You can play against the computer, a friend or have the computer play against itself. Has an interesting graphics display.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K

**T3G105** ..... \$ 7.95

PET VERSION—8K

**P2G105** ..... \$ 7.95

APPLE VERSION—16K

**A2G105** ..... \$ 7.95

**GRAPHIC GAMES-2** Six favorite

games, LEM, lunar lander with a graphic display and optional auto-pilot. NUCLEAR REACTION, a game of skill for two players. ARTILLERY, in which two players shoot it out over computer-generated terrain. BOUNCE traces the path of a ball bouncing around the screen. CHECKERS, with graphic display, from our *BASIC Games* book. DODGEM, try to outmaneuver another player or the computer to get your pieces across the board first.

PET VERSION—8K

**P2G136** ..... \$ 7.95

SORCERER VERSION—16K

**E2G136** ..... \$ 7.95

**CP/M GAMES-1**

An 8" floppy disc containing the first **fifty-one** games from *Basic Computer Games* in Microsoft Basic. All the games from ACEY DUECY to HI—Q including such favorites as ANIMAL, BULL-FIGHT, CRAPS, and HANGMAN. (To run this, you need CP/M and Microsoft Basic.)

CP/M W/8" DISK & MICROSOFT BASIC

**C2G143** ..... \$17.95

**CP/M GAMES-2**

The second half of Basic Computer Games including LIFE, LEM, MUGWUMP, STARS, 23 MATCHES, WORD, and forty-five others. A total of **fifty-one** games in an 8" floppy disc.

CP/M W/8" DISK & MICROSOFT BASIC

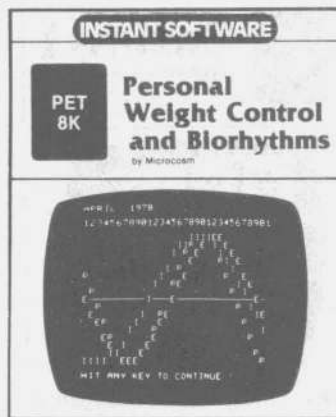
**C2G144** ..... \$17.95

**CP/M SPECIAL PACKAGE**

**CS-9000. Special Package.** Two discs (CS-9001 and CS-9002) and the BASIC COMPUTER GAMES book.

CP/M W/8" DISK & MICROSOFT BASIC

**C2G145** ..... \$37.95

**PERSONAL WEIGHT CONTROL/BIORHYTHMS**

By Microcosm (for the PET™). Here's a program that will let you chart any individual's biorhythm cycle, showing physical, emotional, and intellectual highs and lows. If your neighbors find out you've got it, they will never leave you in peace. **PERSONAL WEIGHT CONTROL** is a must for the diet-conscious. Once your ideal weight has been determined, the program will calculate the correct daily caloric intake necessary to reach your goal over a certain time period.

**0005P** ..... \$7.95

**MORTGAGE WITH PREPAYMENT OPTION/FINANCIER**

By Microcosm (for the PET™). Before you go to the bank, calculate your mortgage payment schedule and find out what you can afford. You will learn how much prepayments save, and can easily compare the true costs of variations in interest. **FINANCIER** is actually three programs in one and is guaranteed to make you a financial wizard. In part I you'll learn to tell which investments will pay off. Part II calculations annual depreciation schedules, providing rates, amounts, and salvage values, which is great when tax time rolls around. The final section figures costs of borrowing, payment terms, and remaining balances on loans of all sizes.

**0006** ..... \$7.95



## CASINO 1



By Charles M. Stuart. There are blackjack games galore, but not many of them are so dependable that you can use them to prepare to make your fortune at Vegas. This blackjack program is not only fun to play, it is also tutorial and allows you to play every combination which you could play at the MGM Grand Hotel in Las Vegas.

There are several systems which will beat the house at blackjack, but before you go investing your cash in a get rich quick attempt, try out your system on this program and see how it does in actual practice.

Roulette programs are more difficult to find, yet this is another very popular casino game—and one you'll want to get some experience with before you venture to go up against the professionals at Vegas. Remember that there are a lot of people who have worked out systems to beat the house at these games and they make a comfortable living going to Vegas every now and then to rebuild their fortune.

This roulette program is tutorial and gives you the odds on each type of bet.

All you need is the expertise and a little luck to go along with it and you'll pay for your computer in no time.

**0014P** ..... \$7.95

## STOCK TRACKER™



**STOCKS • OPTIONS • COMMODITIES** • For Use With Disk TRS-80V4 & APPLE-II\*. Based on supply/demand factors, tells when to buy & sell. Signals are intermediate term for stocks & commodities, short term for options. Error handling routines, utility programs, and user manual w/ sample printouts & documentation included. No experience necessary. Printouts made on any interfaced printer, screen if none. Keeps 7 months—1 year data on up to 15 securities per disk; change disks to track more. 32K RAM minimum, printer recommended. Apple-II\* version requires Applesoft\* card or Language system. SPECIFY DESIRED VERSION WHEN ORDERING: (1) Single-drive TRS-80V2 Multi-drive TRS-80V3 Apple-II\*

**COMPLETE**  
**STHH1** ..... \$149.95  
**MANUAL ONLY**  
**STHH1** ..... \$ 35.95

## CASINO II



By Charles M. Stuart—Yes, there are a lot of craps programs around—so why should you buy this one? The big difference is that this one is not just a crap game, it is also a tutorial program which will give you the odds on every type of bet so you can steer clear of the idiot bets that impoverish the unwary. Did you know that there are bets which give the house as little as 0.8% advantage? It takes precious little luck to overcome such a slight edge—but you have to know where to find these bets before you can use them.

If you use this program to get experienced with craps you should be able to walk away from any craps table a winner. Once you know what bets to make and are able thereby to take the best advantage of lucky streaks, betting lightly to wait through the lean times, you'll have quite an edge.

This program uses the exact rules used at the MGM Grand Hotel in Las Vegas, so you'll be playing under actual gambling house conditions. You should be able not only to pay for the program, but also for your computer system the next time you go to Vegas or Atlantic City.

**0015P** ..... \$7.95

## SD SYSTEMS COMPATABLE SOFTWARE

**SDOS DISK OPERATING SYSTEM, 8", SINGLE DENSITY**  
 Same as 39027 except supplied on 8" Single Sided, Single Density diskettes.

**39029** ..... \$199.95

**SDOS DISK OPERATING SYSTEM, 8", SINGLE DENSITY**  
 Same as 39027 except supplied on 8" Single Sided, Single Density diskettes.

**39030** ..... \$199.95

**SDOS DISK OPERATING SYSTEM, 8", SINGLE DENSITY**  
 Similar to 39027, Single Density, Double Sided, for use with VDB-8024 consoles. Also included is C-Basic II package (see 39026). Operating system for SD-100.

**39031** ..... \$299.95

**SDOS DISK OPERATING SYSTEM, 8", DOUBLE DENSITY**  
 Similar to 39027, Double Density, Double Sided, 8" diskettes for use with VDB-8024 consoles. Also included is C-Basic II package (see 39026). Operating system for SD-200.

**39032** ..... \$299.95

## WORDMASTER WITH TEX-WRITER

Wordmaster provides a complete word processing system, coupled with a screen-oriented text editor, providing users with excellent editing controls. Operates with SD-100 and SD-200 computers.

**39033** ..... \$224.95

## MAD HATTER SOFTWARE

Bored? Tired of mastering the simple computer games? Are you searching for adventure? Search no further! ADVENTURE is here. This is not the average type of computer game which is easily mastered. It may take you hours of practicing before you score and weeks before you attain a respectable score. Rescue missions, treasure hunts, and escapes are incorporated into mind boggling games which are definitely created for the egocentric characteristics in us all. Communicate with the computer with one or two-word commands.

**CAUTION:** MAD HATTER has determined that the ADVENTURE series may be hazardous to your sleeping schedule!

**HOUSE OF SEVEN GABLES** by Greg Hassett (M.H.S.) Explore and find treasures, they're all yours if you can find them. However, there's a catch! You have to destroy the witch to leave.

TRS-80 VERSION LEVEL II/16K  
**T3G162** ..... \$ 9.95  
 APPLE II—16K—APPLESOFT  
**AsG162** ..... \$ 9.95  
 SORCERER—16K\*  
**E2G162** ..... \$ 9.95

**JOURNEY TO THE CENTER OF THE EARTH** by Greg Hassett (M.H.S.) Beware of the earth's hazards as you attempt to gather materials to fix your broken earthdigger.

TRS-80 VERSION LEVEL II/16K  
**T3G163** ..... \$ 9.95  
 APPLE II—16K—APPLESOFT  
**A2G163** ..... \$ 9.95  
 SORCERER—16K\*  
**E2G163** ..... \$ 9.95

**KING TUT'S TOMB** by Greg Hassett (M.H.S.) Beware the evil that lurks within the tomb as you search for Tut's coffin and escape with treasures and your life, if you're lucky!

TRS-80 VERSION LEVEL II/16K  
**T3G164** ..... \$ 9.95  
 APPLE II—16K—APPLESOFT  
**A2G164** ..... \$ 9.95  
 SORCERER—16K\*  
**E2G164** ..... \$ 9.95

**SORCERER'S CASTLE** by Greg Hassett (M.H.S.) Find and enter the sorcerer's castle, gather the treasures, kill the sorcerer, and then try to escape.

TRS-80 VERSION LEVEL II/16K  
**T3G165** ..... \$ 9.95  
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**ADVENTURE DISK "B"** by Scott Adams (A.I.) Contains ADVENTURELAND and PIRATE ADVENTURE.

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Letter after letter, the **PENCIL SHARPENER™** will **replace** the key words in your letter with the appropriate items of information and then **print** the personalized letter using the Electric Pencil II™. The next set of names, addresses and other information is brought in and the process is repeated...within 6 seconds, your letter is customized for each set of data and then printing begins.

Walk away and let the **PENCIL SHARPENER™** send out hundreds of letters for you. You can maintain the "data file" as your permanent mailing list and customer information resource. We also include utility routines to set up your data files using standard mailing list programs, CBASIC, BASIC-E, and Microsoft BASIC. Depending on the printer you use, you can even configure your system to print subscripts, superscripts, dual fonts and more!

Specify the **disk system** you are using...5" or 8", CP/M compatible, single-density, double-density, North Star Compatible, SOL, etc. The **PENCIL SHARPENER™** will work with any and all versions of The Electric Pencil II™...it uses your versions' I/O routines and print capabilities...no modification or special patches are required.

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Tarbell BASIC incorporates many new features which provide outstanding advantages in speed, debugging, file locating, and tailoring to the user's own requirements. This implementation of Tarbell BASIC is as an interpreter, allowing the programmer to quickly debug online, rather than having to move back and forth through edit, compile, and run operations. By obtaining the source, available as a listing or on CP/M\* disk, programmers can readily remove all portions of the interpreter which are not required.

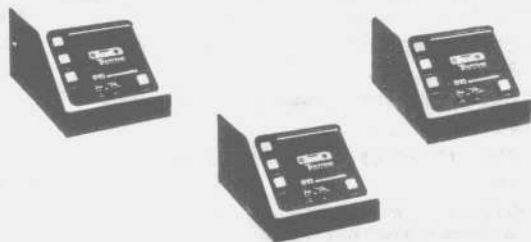
Z80 owners will be able to take advantage of the availability of Tarbell BASIC source listings by patching in Z80 instructions, further improving the speed of Tarbell BASIC.

Tarbell BASIC occupies 24K of RAM. Available on cassette and CP/M Disk. Manual includes complete discussion of operation, and even lists known bugs, related publications and sample program.

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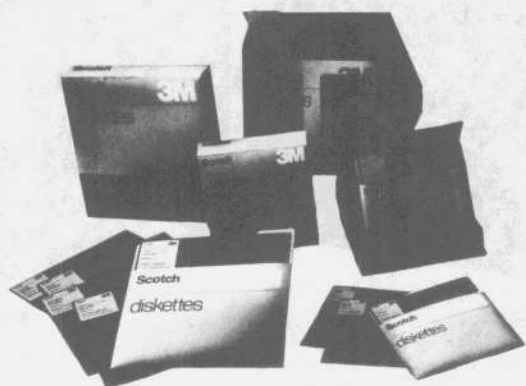
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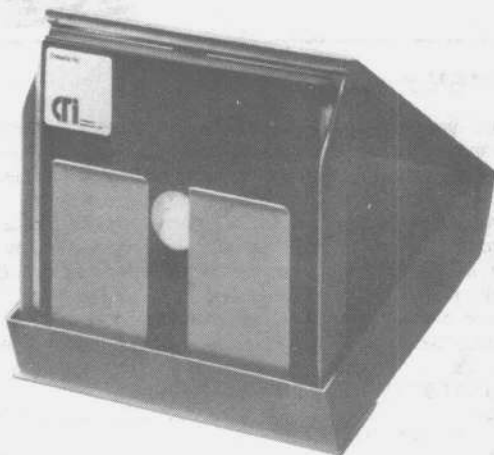
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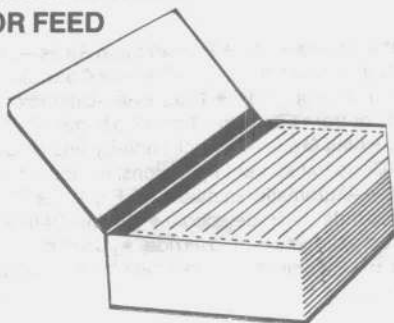


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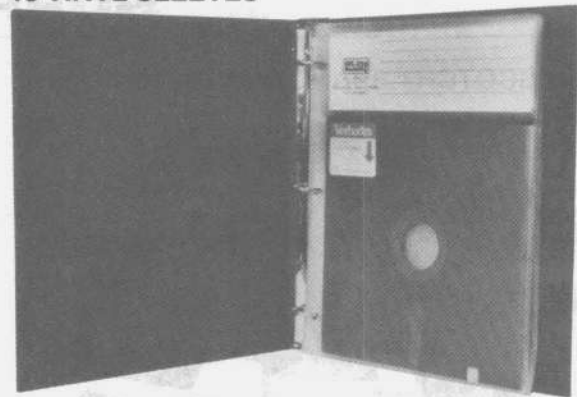
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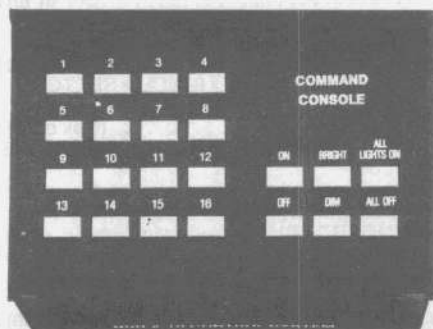
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## SYSTEM X-10

Control your lights and Household appliances with fingertip convenience, all for under \$100. **EASY TO INSTALL.** System X-10 requires no special wiring or complicated installation. Simply plug the Command Console into your wall outlet in any desired location in your home. Plug each lamp or appliance into the appropriate module and then plug that module into any wall outlet. By setting the house code and unit code on each module, you are now ready to operate the system. For less than \$100,\* you can own a System X-10 Command Console with enough modules to control lights and appliances at up to four different locations.

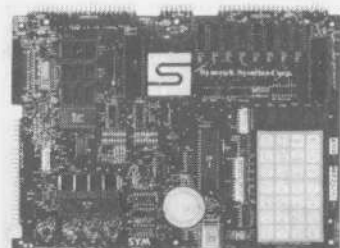
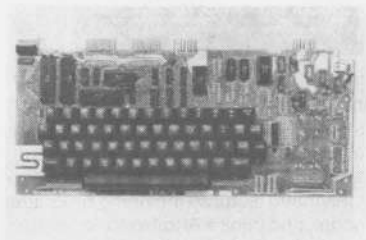
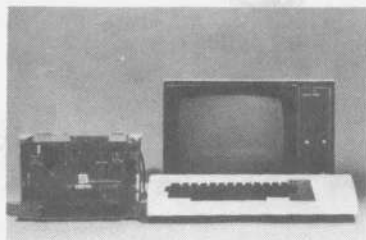
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# SYM, KIM

SYM, KIM

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All 128 ASCII Codes • 94 Displayable Characters including Lower Case • High Resolution Characters using a 7 x 10 Dot Matrix • ANSI Standard Keyboard Layout • Separate Integral Numeric Pad • Dual Intensity • Cursor Addressing and Sensing • EIA and 20 mA Interface • Baud Rates up to 19.2 KB • Auxiliary EIA Output • Remote Editing Commands • Standard or Reverse Video

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Serial/Parallel printer interface • Microprocessor controlled printer interface with 2K buffer • All 128 ASCII Codes • 95 Displayable Characters Including Lower Case • High-Resolution Characters using a 7 x 10 Dot Matrix • ANSI Standard Keyboard Layout • Numeric Pad and Cursor Control Keys • Dual Intensity • Cursor Addressing and Sensing • EIA and 20 mA Interface • Baud Rates up to 19.2 KB • Auxiliary EIA Output • Remote Editing Commands • Standard or Reverse Video • Protected/Unprotected Data • Transmit Batch/Line/Page of "Unprotected Only" or Protected and Unprotected • Function Keys • Tab/Back Tab/Auto Tab • Format Mode with Insert and Delete Line Keys

**HAZA30118** ..... \$1295.95

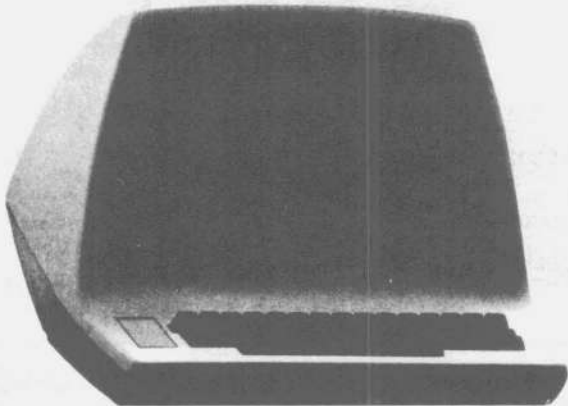
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Designed and manufactured by Data General • 1920 characters, 24 lines of 80 characters each • 96 upper and lower case ASCII character standard • Detached keyboard • Typewriter keyboard layout • Direct cursor positioning and sensing • Character highlighting features, including programmable brightness, underscore, and blink • Audible tone on "Bell" character • 7x8 dot matrix character format • 11 function keys, standard • Separate 11-key data entry pad • Swivel and tilt display adjustment • Hard copy printer option • Industry compatible interface, RS-232C and 20mA • Up to 19.2K bits per second asynchronous transmission • International character sets available • Software supported on ECLIPSE®, NOVA®, and micro-NOVA systems.

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The Lear Siegler ADM-3A "Dumb Terminal" is a prime self-contained video display terminal for applications in the home and in business where a fast and quiet full 24 line by 80 characters/line display is needed. With 80 columns (the standard margin for 8½" x 11" paper), it provides greater character resolution and better visual quality than a home TV monitor and is excellent as a stand-alone or timesharing terminal. It is also remarkably compact and light weight for portability, and can be daisy-chained to other terminals and printers in a business environment.

**LSIA30182** ..... \$859.95

## BANTAM 550



From PERKIN ELMER

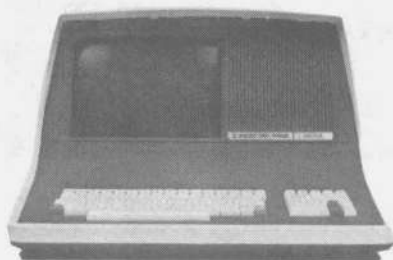
**Screen Format:** Screen size—12 inches (diagonal) • Screen capacity—1920 characters • Number of lines—24 • Characters per line—80 • Phosphor—128 (upper/lower case, numbers, punctuation, and control characters) • Character field—7 x 10 • Character matrix—5 x 9 • Number of scans—10 per character • Refresh rate—50/60Hz (non-interlaced).

**Keyboard:** Character code—ASCII (expanded through ESC code sequence) • Keyboard layout—ASCII (bit pairing) • Repeat key rate—15 cps • Shadowed numeric pad—0-9, decimal point, comma.

**Switch Format:** Baud rate—110, 200, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, or 9600 Baud • Stop bits—One or two • Transmission—Full or half duplex • Parity—Space, mark, even or odd • Refresh rate—50/60Hz • Video—Black-on-White (inverse video) • 115V (60Hz), (115/230V (60/50Hz) optional) • Communications—EIA RS232C (standard) or 20ma current loop (optional) • Modem control—The DTR lead to the modem is disabled when the terminal is in local mode. • Transparent mode—Causes the BANTAM to ignore control sequences and display all characters coming down the communication line. • Current loop power—Switch-selectable. +12V and -12V are supplied by the BANTAM when the current loop option is used. • Size—15 in. W (38.5 cm) x 19 in. D (48.7 cm) x 14 in. H (35.9 cm) • Weight—Less than 28 lbs. (12.7 kb) • Appearance—The BANTAM has an off-white exterior with a charcoal grey front. The standard keyboard contains highlighted control keys which facilitate high-speed operations.

PEBNTM550 ..... \$779.95

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24 x 80 Character Display • 25th Line for Terminal Status • Two EIA Interfaces Main and Auxiliary • Full ASCII Upper and Lower Case • Conversation, Message and Page Modes • Editing—Char/Line, Insert/Delete • Reverse Video Blinking Half Intensity • 11 Special Graphics Characters • Cursor Addressing • 28 Programmable Function Keys • 14 Key Numbers Pad • Protected Fields • Self Test Mode

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24 lines of 80 characters • Upper and descending lower case • Programmable intensity/Protected Fields • Data rates from 110 to 9,600 baud • Complete hardware and software compatibility • Switch selectable impersonation of: Micro—Term ACT-IV, LSI-ADM3A, DEC-VT52, HAZ-1500.

Character Set—96 upper and lower case ASCII plus 32 graphic characters • Serial Input/Output—RS232c or current loop (standard) serial ASCII, stop bits and parity switch selectable. • Duplex—Full or half-switch selectable • Monitor—High resolution 12 inch diagonal screen.

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MIME I WITHOUT NUMERIC KYPD

A31841 ..... \$789.95

MIME II WITH NUMERIC KYPD

A32148 ..... \$829.95

## O E 100 TERMINAL



The OE 1000 TERMINAL is a stand alone terminal that can be used with any mini/micro computer having serial data output. The terminal accepts data in the serial form of full duplex, three hundred bits per second, 20 ma current loop or EIA RS 232. The terminal outputs composite video for use by a modified television or video monitor. • 16 Lines of 64 characters • 128 character display set • Automatic display set • Full X-Y cursor control • TTY mode or Upper/lower case mode • 57 key keyboard Light Blue • high impact plastic case 21" long • 19" wide 6" high • Operates on 115 v AC • Composite video output

OTTO1000 ..... \$379.95



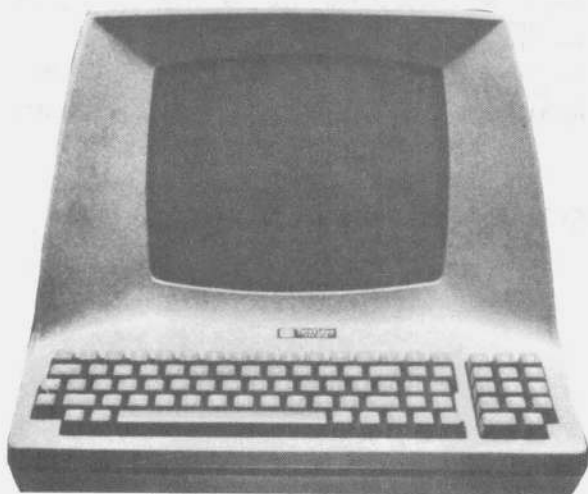
## REGENT 20



This handsome terminal features a full upper and lower case keyboard and display...crisp, easy-to-read 5 x 8 dot characters with descenders, in a 24-line by 80-character format...EIA and Current Loop interfaces, with speeds up to 9600 baud...full incremental cursor movement and cursor addressability...plus an auxiliary output interface for serial printers, including a "print transparent" capability.

REG2020 ..... \$859.95

## TELEVIDEO



Upper case and lower case; 10 baud rates, 75 to 19,000 baud; dual intensity; 24 x 80 char; 12 x 10 character resolution; numeric pad; programmable reversible video; non-glare screen; full editing capabilities; self test mode; protect mode; block mode; tabbing; addressable cursor; microprocessor controlled; programmable underline; line and character insert/delete; 115/230 VAC, 50/60 Hz, 65W.

SERIAL RS-232 IN AND OUT, MODEL TVI-912

TVIA32105 ..... \$749.95

MODEL TUI-920, SAME AS 912 WITH 80 STORAGE TABBING AND SPECIAL FUNCTION KEYS

TVIA32106 ..... \$799.95

## REGENT 25



**Standard Features:** All 128 ASCII codes • 18-Key numeric keypad and cursor control keys • Monitor mode displays data stream including the 32 ASCII control codes • Switch selection of 6 foreign language character fonts • 12 inch diagonal screen with non-glare faceplate • Conversational operating mode • Parity—even, odd, marking or spacing • Baud Rates up to 9600

**Display Characteristics:** **Screen Format**—24 lines by 80 characters 5 x 8 dot matrix • **Reverse Video**—White on Black or Black on White • **Refresh Rate**—60 frames/second • **Cursor**—Blinking or steady, block or underline • **Addressable Cursor**—Direct positioning by either incremental steps, absolute address, or separate line and column address.

**Printer Interface:** Full or half duplex • EIA RS232C connector or current loop connector • 20 MA externally sourced

ADDA32331 ..... \$995.95

## REGENT 60



The *Regent 60* is the third member of the upward-compatible Regent family. It is especially designed for the user who needs the inherent flexibility of buffered display.

It utilizes an 80-character by 24-line format and displays crisp, well-defined upper/lower case characters within an 8 x 8 dot matrix.

In addition to a standard typing array—14-key numeric pad, 8 function keys, and cursor control keys—the Regent 60 keyboard provides Print Local, Editing, and Transmission Mode keys.

Transmission can be by character, line, or page, giving the user total flexibility.

REG6060 ..... \$1499.95

## REGENT 40



**Screen Format**—24 lines by 80 characters per line. • **Alpha-numeric Character Set**—96 displayable ASCII codes and 32 control codes, each formed by an 8 x 8 dot matrix. • **Line Drawing Character Set**—11 special graphics symbols. • **Display Presentation**—Dark characters on a light background (reversible through switch selection). • **Visual Attributes**—Blinking at 2 frames per second, underline, reverse video, half intensity, zero intensity. • **Status Line**—25th line reserved for terminal status messages, in the inverse of the normal display; can be turned off by command. • **Screen Size**—12" diagonal. • **Refresh Rate**—60 frames per second (50 for export model). • **Operating Mode**—Conversational (character at a time) transmission. • **Transmission**—Full duplex or half duplex, switch selectable. • **Communications Interface**—EIA RS232C/CCITT V. 24 operates through the range of 110 to 9600 baud, switch selectable. 20/60 MA current loop operates through the range of 110 to 9600 baud, switch selectable. • **Parity**—Choice of even, odd, marking or spacing, switch selectable. • **Keyboard**—Standard typewriter-like layout plus 14-key numeric pad (most are typematic keys), local mode and erase. Keyboard lock/unlock under computer control. Eight preprogrammed function keys, five operating convenience keys to move the cursor up, down, left, right, and home. • **Test Mode**—Self-diagnostic firmware program executes upon power-up with result in Status Line. • **Addressable Cursor**—Direct positioning by either discrete or absolute address. • **Read Terminal Status**—Allows host computer to interrogate for terminal status, present cursor address and memory value at cursor position. • **Auxiliary Interface**—EIA Serial, bidirectional peripheral interface. • **Print Transparent**—Terminal will pass all received data to Auxiliary Port and neither display nor act upon it. • **Insert/Delete Line**—Software executable editing function. • **Cursor Selection**—Allows hardware selection of cursor presentation; blink or non-blink, block or underline. • **Monitor Mode**—Allows the terminal to display all received data including control codes. In this mode all encoded sequences are ignored. • **Printer Busy Indicator**—Terminal will automatically issue the appropriate X-ON, X-OFF sequence when an Auxiliary device becomes busy. • **Weight**—Approx. 38 pounds (17 kg). • **Dimensions**—Height: 15" (38 cm) Width: 18.5" (47 cm) Depth: 23.25" (59 cm). • **Power**—110 Volts @ 60 Hz (220 Volts @ 50 Hz for export model). • **Operating Temperature**—10° 40°C. • **Storage Temperature**—0° to 85°C. • **Humidity**—10 to 95% RH, non-condensing.

ADDA32377 ..... \$1295.95

## ADM-42



The ADM-42 is a low-cost, semi-intelligent video display terminal that provides you with total flexibility of format, editing, interface and transmission.

It features a full, two-page display optionally expandable to eight full pages, a high resolution, 15 inch diagonal display screen with 2000 characters in 24 rows of 80 characters in a 7 x 11 dot matrix, and a 25th line provided exclusively for terminal status indicators and messages from the host of up to 79 characters.

The ADM-42 also features a detachable keyboard with upper and lower case, numerics, punctuation, control, numeric keypad and 16 function keys shiftable to 32 functions as standard. In addition to complete cursor positioning from the keyboard or host computer, the operator may designate fields in blanking/underlining, blinking or reverse video modes to highlight key data. A field protection mode also protects specific areas on the screen.

The ADM-42 also has three tab settings: a protect mode, a modulo tab and a columnar tab. Other standard editing capabilities include: clear space, character/line insert, character/line delete, line erase, page erase, and tab/back tab.

Full or half duplex conversation modes are also switch and keyboard selectable. Standard block transmission modes are: send line unprotected, send line all, send page protected, send page all, send cursor coordinate and send function sequence.

Like the ADM-31, the ADM-42 is preprogrammed at the factory for compatibility with many standard computer systems. A synchronous communications interface, special character generator, programmable function keys, line drawing set, and serial/parallel printer interfaces are also available as options. The ADM-42 is upward compatible with the ADM-2.

LSIA31861 ..... \$1599.95

## SOROC IQ 140



• Extensive editing features • 25th line terminal status display • 16 function keys (32 with shift) • Detachable 117-key keyboard • Standard printer port with separate baud rate • Blinking, underline, reverse video, 1/2 intensity

SORA30716 ..... \$1299.95

## ADM-31



The ADM-31 is a low cost, high reliability CRT with full editing capabilities, formatting, protected fields and two full 1920 character pages of memory as standard.

The microprocessor based ADM-31 features a high resolution, 12 inch diagonal display screen with 24 lines of 80 characters in a 7 x 11 dot matrix. Its 90 key keyboard is integrated with main logic and is capable of generating all 128 ASCII characters (upper & lower case, numerics, punctuation, and control). An integral numeric keypad, a function key to transmit a special function sequence to the host, and a computer or keyboard selectable behavior modification feature for compatibility with a variety of computer systems are also included as standard.

The ADM-31's editing capabilities let you clear the screen, or utilize the cursor for character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any page and X-Y coordinate. The controls let you skip, backspace, fespace, move up, down, return, home, and new line. You can also store the control characters and they'll display as a reverse image. The terminal comes standard with character insert/delete, line insert/delete, erase to end of line/field/screen, and back tab. The ADM-31 can also clear to protected spaces and unprotected nulls, and set and reset copyprint. It is upward compatible with the ADM-1A.

LSIZ31856 ..... \$1399.95

## SOROC IQ 120, 140



• Upper/lower case display • Numeric keypad & cursor keys • Protected fields, 1/2 intensity display • RS 232 interface & aux. port

IQ 120 ..... \$ 799.95

DETACHABLE KEYBOARD

IQ 140 ..... \$1195.95

## VT100



**Human Engineering** • Sculptured typewriter-like detachable keyboard • Standard numeric/function keypad • Selectable double-size characters • Up to 132 characters per line • Bidirectional smooth scrolling • Split screen capability • Normal or reverse video on a character-by-character basis • Optional blinking, underline, and dual intensity characters • Black characters on white screen or vice versa, user-selectable • Fixed and settable tabs • US and UK character sets • Line drawing graphic characters

**Maintainability:** Easily upgraded to a more sophisticated system • Composite video output for auxiliary monitors • Composite video input for video overlay • Transmission speeds up to 19,200 baud • VT52 compatibility mode for easy upgrade • Seven light-emitting diodes for operator information/diagnostic aids • Non-volume Random Access Memory holds feature settings • Full duplex, asynchronous communication lines

453J ..... \$1899.95

## VISUAL 200



## VISUAL 200 CONT'D

The new VISUAL 200 terminal has the features of competitive terminals and will code-for-code emulate them as well. A flick of a switch on the rear panel programs the VISUAL 200 for compatibility with a Hazeltine 1500, ADDS 520, Lear Siegler ADM-3A or DEC VT-52. To an O.E.M. customer it means no change in software to displace the older, less powerful terminals in his product line with the new, reliable and low cost VISUAL 200. To a Distributor it means offering a single modern terminal which is compatible with all the software his customers have written for the older terminals. And you're not limited to mere emulation; you can outperform them at the same time by taking

advantage of the additional features and human engineering of the VISUAL 200, such as: Detachable Solid State Keyboard • Tilt screen (10° to 15°) • Large 7 x 9 dot matrix characters • 24 x 80 screen format • Background/foreground • Insert/delete line • Insert/delete character • Clear end line/field/page • Blink • security mode • Columnar and field tab • Line drawing • Upper/lower case • Numeric pad • Composite video • Current loop • Serial copy port • Hold screen • Detachable keyboard • Typamatic keys • Cursor addressing • Cursor control keys • Secondary channel • Self test • Baud rate to 19,20 • Smooth scroll • Microprocessor • Tilt screen • Switchable emulations.  
**239205 ..... \$1195.95**

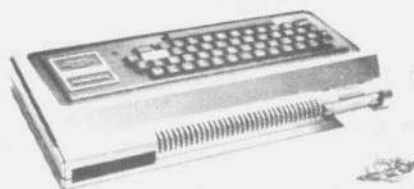
## TRS-80 HARDWARE

### SOUND EFFECTS AND MUSIC FOR YOUR COMPUTER

### TRS-80\* HARDCOPY INTERFACE!



**PET TRS-80 Compucolor II**  
 ADD SOUND TO YOUR BASIC PROGRAM!



**PRINT:** Mailing lists, form letters, invoices, inventories, checks... whatever you need to print! Using Level II Basic LPRINT and LLIST Commands. No modification of your system is necessary. The GPA TRS-80 Hardcopy Interface plugs directly into the back of your TRS-80 (or your Expansion Interface). RS-232-C or 20 ma. current loop compatible.

**ASSEMBLED AND TESTED**  
**GPA8041 ..... \$69.95**

### TRS-6

**SOUNDWARE** adds a whole new dimension to your computer. Games and programs come to life with laser sounds, bird calls, bounces, clicks, sirens, music notes, tunes, and whatever else your imagination dreams up.

### NOW! A FULL SUPPORT SYSTEM FOR TRS-80

**SOUNDWARE** is a complete system. It includes a speaker/amplifier unit with volume control, earphone jack, and connectors. It boasts excellent tone quality yet is small and convenient to use. Add batteries, plug it in, and play. One year warranty.



The **INTRO** to **SOUNDWARE** programs include "Demo" and "Sound Composer" and provide all the tools for programming you need to make sound. You get: A variety of sample sound effects and musical notes • Directions to easily create your own sounds and tunes • Complete instructions, including sample BASIC subroutines, for adding sound to any program

32K of RAM • EPROM firmware • Disk control • Data acquisition • Parallel I/O • Serial I/O • Plug into GPA's Motherboard. GPA's quality design includes • 6-44 pin edge connectors, required • +5V, -5V, +12V, -12V external power supply • Active termination.  
**MOTHERBOARD**  
**GPA80 ..... \$149.95**

- SOUNDWARE PACKAGE**—Includes intro to **SOUNDWARE** Programs
- FOR PET 8K**
  - 20001 ..... \$29.95**
  - FOR TRS-80 LEVEL II 16K**
  - 20002 ..... \$29.95**
  - FOR COMPUCOLOR II 8K**
  - 20003 ..... \$39.95**
  - INTRO TO SOUNDWARE ONLY**
  - FOR PET AND TRS-80**
  - 20004 ..... \$14.95**
  - FOR COMPUCOLOR II**
  - 20005 ..... \$19.95**

## TAKE ADVANTAGE OF GPA-EXPANSION CARDS FOR THE GPA80

**Memory cards:** Now with Fortran compilers available for your TRS-80, additional expansion memory is a must!  
CARD WITH SOCKETS ONLY

**GPA801** ..... \$119.95.

CARD WITH 16K OF 4116 DYNAMIC RAM

**GPA-802** ..... \$224.95

CARD WITH 32K OF 4116 DYNAMIC RAM

**GPA803** ..... \$329.95

All cards come equipped with sockets to accommodate 33K of RAM.

**EPROM Firmware card:** Put those valuable subroutines in firmware. Don't waste time loading and unloading tapes and disks.

FOR 2708 OR 2716 EPROMS

**GPA806** ..... \$ 79.95

**Serial I/O Card:** Here's what you've been asking for, a full serial terminal interface, with RS-232C or 20MA. current loop. Input/output capabilities.

**GPA807** ..... \$ 79.95

**Parallel I/O Card:** Control functions in the outside world, monitor and store real time events. Two parallel output ports. Dip switches select ports (0-254)

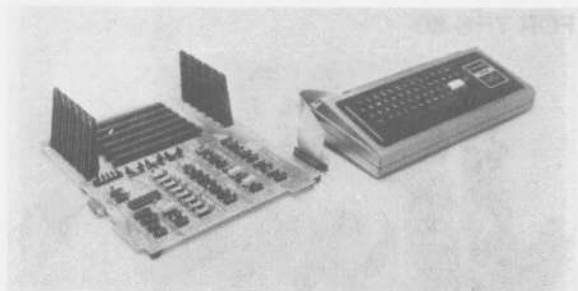
**GPA808** ..... \$ 79.95

## SYSTEM EXPANSION

Serial RS232C/ 20 mA I/O • Floppy controller • 32K bytes memory • Parallel printer port • Dual cassette port • Real-time clock • Screen printer bus • Onboard power supply • Software compatible • Solder mask silk screen • From LNW Research PC BOARD & USER MANUAL

**LNW80** ..... \$69.95

## THE 8100 BY HUH AN S-100 BUS ADAPTER/MOTHERBOARD FOR THE TRS-80



The 8100 allows a Radio Shack TRS-80 computer to be interfaced to the popular S-100 Bus for memory expansion and extended I/O capabilities.

The 8100 opens up a whole new world of peripheral devices to the TRS-80 owner. For example, you can now easily add more memory, floppy disc systems, PROM boards, printer interfaces, multi-purpose I/O boards, AC device controllers, and a whole host of other varied peripherals.

The 8100 is designed to sit on a table top next to your TRS-80 and connects to it via a ribbon cable. A second TRS-80 connector allows other TRS-80 devices to be connected at the same time.

## 8100 CONT'D

Not only do you get an S-100 bus interface and motherboard, but the 8100 has more on board options-

**DYNAMIC RAM: Chips Used**—Uses either 4K or 16K 16 pin dynamic RAM's such as 4027 or 4116 or their equivalent—user must supply RAM chips. Any TRS-80 compatible RAM expansion kit will work. • **Addressing**—May be split into four 4K blocks. Each block individually addressable to any 4K boundary via dip switch. • **Refresh**—Transparent to CPU operation. Does not slow CPU.

**SERIAL: Type**—Asynchronous, RS232 or 20 ma current loop, jumper selected. • **Baud rate**—Crystal controlled. Software programmable from DC to 56K baud. Non-standard baud rates as easily programmed as standard baud rates. • **Stop bits**—Software selectable 1, 1½, or 2 stop bits. • **Parity**—Software selectable even, odd or none. • **Word length**—Software selectable 5, 6, 7, or 8 bits.

**PARALLEL: General**—8 bits per port plus strobes. Auxiliary voltages provided at connector. • **Input**—Latched data and strobe lines. Jumper selectable for either positive or negative strobe inputs. Inputs LSTTL. • **Output**—Latched data. Positive and negative strobes simultaneously available. LSTTL outputs.

**ON A S-100 BUS INTERFACE: Motherboard**—6 slots, card guides and extension connector for adding another motherboard. Basic unit includes only one connector and card guide set. (Additional connectors extra.) • **Interface**—All the most commonly used S-100 Bus signals are implemented including PSYNC and MWRITE. All lines buffered. • **Clocks**—01 and 02 run at 1.76 Mhz synchronous with the TRS-80 clock. Crystal controlled 2 Mhz clock provided on S-100 Bus pin 49 (CLOCK).

• **Power Req.**—Requires standard S-100 power supply, user must supply. • **Limitation**—DMA not available. Wait states longer than 1 millisecond are not allowed because of the dynamic memory in the TRS-80.

### BASIC UNIT (S-100 INTERFACE)

**8100K** ..... \$185.95

ASSEMBLED AND TESTED

**8100** ..... \$245.95

### BASIC UNIT WITH RAM SUPPORT

**8100RSK** ..... \$229.95

ASSEMBLED AND TESTED

**8100RS** ..... \$319.95

### BASIC UNIT WITH I/O OPTION

**81001K** ..... \$269.95

ASSEMBLED AND TESTED

**810010** ..... \$359.95

### BASIC UNIT & 5 CONN WITH CARD GUIDES

**8100CCGK** ..... \$229.95

ASSEMBLED AND TESTED

**8100CCG** ..... \$319.95

### BASIC UNIT WITH RAM SUPPORT & I/O OPTION

**8100RSIOK** ..... \$315.95

ASSEMBLED AND TESTED

**8100RSIO** ..... \$435.95

### BASIC UNIT WITH RAM SUPPORT & 5 CONN WITH CARD GUIDES

**8100RSCCGK** ..... \$275.95

ASSEMBLED AND TESTED

**8100RSCCG** ..... \$395.95

### BASIC UNIT WITH I/O SUPPORT & CONN WITH CARD GUIDES

**8100IOCCGK** ..... \$315.95

ASSEMBLED AND TESTED

**8100IOCCG** ..... \$435.95

## 8100 CONT'D

### BASIC UNIT WITH ALL OPTIONS

KIT	
<b>8100DLXK</b> .....	\$295.95
ASSEMBLED AND TESTED	
<b>8100DLX</b> .....	\$375.95

HUH Electronics® 8100 is the established leader in S-100/ TRS-80 Interfaces, running reliably since November 1978 and giving you the most features for your dollar. But some folks don't need all the 8100's versatility or want something more compact.

So we created the **MINI-8100** has the same proven reliable S-100 Bus interface circuitry as its big brother couples with 4 slot shielded motherboard. It connects to TRS-80 or to the expansion interface and opens up the vast world of S-100 Bus products to the TRS-80 owner.

For those of you who already own an S-100 mainframe or motherboard, the **MINI-8100** may be purchased without the built-in motherboard, (**MINI-8100**). Just plug it in and go!

The **MINI-8100** has the same high quality as all HUH Electronics products—easy assembly, fully socketed, solder mask and silk screen component legend, comprehensive manual and design excellence that speaks for itself.

<b>INCLUDES ALL PARTS &amp; ONE S-100 CONNECTOR</b>	
<b>8100</b> .....	\$115.95
ASSEMBLED AND TESTED, INCLUDES 4 S-100 CONNECTORS	
<b>8100ASM</b> .....	\$155.95
<b>S-100 SIZED BOARD, PLUGS INTO MAINFRAME</b>	
KIT	
<b>8100SK</b> .....	\$ 95.95
ASSEMBLED AND TESTED	
<b>8100SASM</b> .....	\$125.95

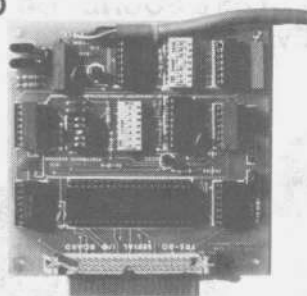
## IBEX LIGHT PEN



Comes with Backgammon and Tic-Tac-Toe on tape with full documentation and program listing. Requires 9v. battery.

<b>IBEX</b> .....	\$19.95
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## SERIAL I/O



Can input into basic • Can use LLIST and LPRINT to output, or output continuously • RS-232 compatible • Can be used with or without the expansion bus • On board switch selectable Baud rates of 75, 110, 134.5, 150, 300, 600, 1200, 2400, 4800, 9600, 19.2K parity or no parity odd or even, 5 to 8 data bits, and 1 or 2 stop bits. D.T.R. line • Requires +5, -12 VDC • No connectors provided, see below.

KIT	
<b>KT8010A</b> .....	\$59.95
ASSEMBLED	
<b>8010C</b> .....	\$79.95

## 3' RIBBON CABLE

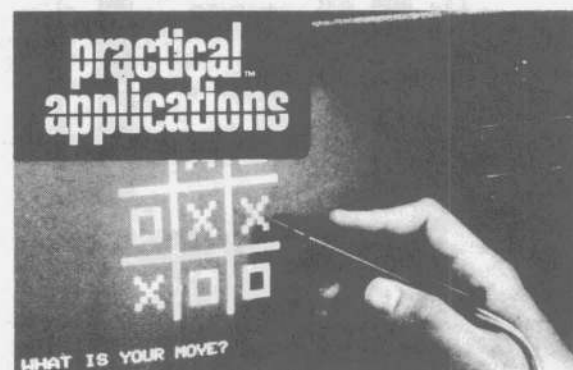
3' ribbon cable with attached connectors to fit TRS-80 and our serial board

<b>3CAB40</b> .....	\$19.95
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## EIA/RS-232 CONNECTOR

CONNECTOR AND HOOD	
<b>DB25</b> .....	\$ 5.95
WITH 9 FOOT 8 CONECTOR CABLE	
<b>DB25P9</b> .....	\$ 9.95

## LIGHT-PEN FOR YOUR TRS-80



**INTRODUCTION TO THE TRS-80 LIGHT-PEN:** Your TRS-80 Light-Pen is a carefully engineered instrument and with the proper care will give satisfactory use and many years of service.

<b>TRS80LP</b> .....	\$24.95
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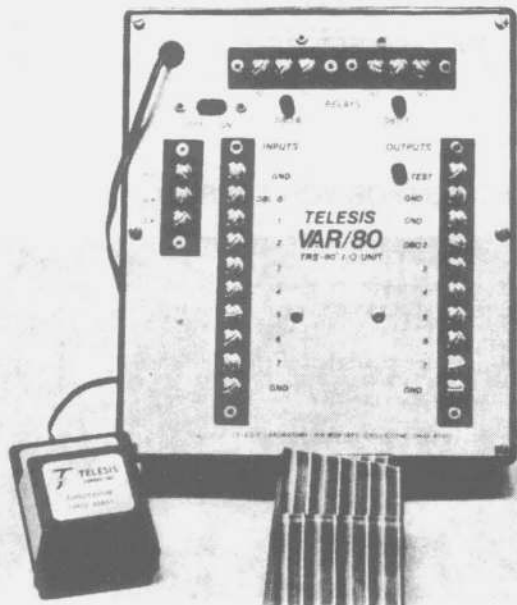
**GAME PADDLES & SOUND FOR YOUR TRS-80 (LEVEL II OR DISK)**



Includes: 2 game paddles, interface, software, speaker, power supply, full documentation including: schematics, theory of operation, and user guide; plus 2 games on cassette (Pong and Starship War).

7922C ..... \$79.95

**THE TELESIS VAR-80 INTERFACE UNIT FOR THE TRS-80 (Level II BASIC)**



Provides 8 outputs; Provides 8 inputs; 2' of interconnecting cable w/connector; Plugs directly into TRS-80; Power supply provided; Assembled and tested. Power Requirements: 115VAC, 2 watts max. Outputs 2 relays

**TELESIS CONT'D**

(rated 3A @ 115V); 6 TTL. Inputs 2 opto isolated (anode & cathode brought out); 6 TTL. Instructions to access the VAR-80: Level II BASIC only — INP (0): Inputs numbers 0-225 which indicates status of input port (binary equivalent of outputs "ON") EXAMPLE: X = INP (0); Print X. OUT (0, X): X is a numerical code 0-255 which will turn on an output combination. EXAMPLE: x = 63; OUT (0, X) This will turn "on" the following outputs 00111111, (DBO0-DBO5). Terminations: Barrier strips on inputs and outputs. Size: 7<sup>3</sup>/<sub>8</sub>"x8<sup>3</sup>/<sub>8</sub>"x3". Indicator LED's: One on each relay output to indicate relay state. One which user may connect to ANY logic input or output for testing convenience. The 8 inputs and 8 outputs are assigned binary wights, i.e., DBO0 = 1, DBO1 = 2, etc.

VAR80 ..... \$109.95

**DATA SCRAMBLER**



**WHAT IS CRYPTEXT?** CRYPTEXT is a hardware encryption device designed to provide microcomputer users with the capability of storing or transmitting data in encoded (scrambled) form. Once encoded, the data is highly secure against unauthorized access.

To encode data using CRYPTEXT, the microcomputer must first supply CRYPTEXT a key consisting of up to ten characters (80 bits). Once initialized, CRYPTEXT accepts any sequence of characters (the "plaintext") from the microcomputer and supplies a sequence of bytes (the encoded data, or "ciphertext") back to the microcomputer for subsequent storage in memory or on disk or tape, or for transmission by conventional means. The decoding process is identical: when provided with a key and the ciphertext, CRYPTEXT returns the original plaintext to the microcomputer. Unless the same key is used both to encode and decode a particular set of data, the encoded data cannot be correctly decoded. Documentation supplied with each unit enables users to conveniently develop software for accessing CRYPTEXT from Radio Shack Level II BASIC or from assembly language.

Complete encryption package for TRS-80: CRYPTEXT unit • DEMO software • USERS MANUAL • Extension cable F-M-M • Power Cable

CPTX80 ..... \$389.95

Complete encryption package for APPLE II: CRYPTEXT unit • APPLECRYPT interface board • USERS MANUAL • DEMO software

CPTXA ..... \$499.95

CODEFILE disk software (available on mini-diskette at add'l cost) allow rapid encryption of any TRSDOS disk file.

CPTXSW ..... \$29.95

## RAMROM PATROL/TIE FIGHTER/KLINGON CAPTURE

Buck Rogers never had it so good. Engage in extraterrestrial warfare with: • **Ramrom Patrol**—Destroy the Ramrom ships before they capture you. • **Tie Fighter**—Destroy the enemy Tie fighters and become a hero of the rebellion. • **Klingon Capture**—You must capture the Klingon ship intact. It's you and your TRS-80 Level II 16K battling across the galaxy.

0028R ..... \$7.95

## DOODLES AND DISPLAYS II

**Doodle Pad**—The keyboard of your TRS-80 becomes an artist's palette that lets you create your own masterpieces on the screen and store them on cassette for future unveiling. • **Math Curves**—Your computer will put more life into your child's geometry lessons as it plots and displays curves produced by six commonly used geometric formulas. • **Random Pattern Display**—Here's a program that lets your TRS-80 do the drawing all on its own. Those with itchy fingers can tamper with the program to produce a variety of visual effects. • **Symmetrics**—Remember the kaleidoscope you played with as a child? Symmetrics brings those same hypnotic patterns to the screen of your TRS-80. • **Drawing**—With almost 40 user commands that give you virtually limitless control over the display. Drawing is about the finest program for computer art available today. The program also provides for storing up to five drawings in memory or on cassette for future revision or use. • **Rug Patterns**—Whether you're a craftsperson looking for some unusual patterns for rugs, Afghans, tablecloths, or blankets—or just the sort who likes to sit back and be entertained—this never-ending stream of unusual patterns is sure to spark your imagination.

0042R ..... \$7.95

## TEACHER

For decades, leading educators and computer scientists alike have been touting the future role of computers in education. Now you and your family can reap the benefits of computer-assisted instruction in the comfort of your own home. This practical program allows you to input any number of questions and answers from the fields of science, languages, history—you name it. Using this data, the computer will prepare several types of tests, quiz students—providing up to three hints per question—even offer graphic rewards for younger children, all at the user's discretion. • **Teacher Data Transfer**—This time-saving program allows the instructor to record several tests sequentially on a single cassette, thereby permitting the administration of whole lessons without the inconvenience of changing cassettes.

Teacher is effective, practical, easy-to-use—perfect for teachers, parents, businessmen or anyone faced with learning a lot of material in the shortest possible time. Furnished with black data cassette.

0065R ..... \$9.95

## CARDS

This one-player package will let you play cards with your TRS-80—talk about a poker face! • **Draw and Stud Poker**—These two programs will keep your game sharp. • **No-Trump Bridge**—Play this popular game with your computer and develop your strategy. This package's name says it all. Requires a TRS-80 Level II 16K.

0063R ..... \$7.95

## TRS-80 UTILITY I

Tired of having your best programming efforts frustrated by the lack of tools? These two powerful TRS-80 utility programs should be stock equipment in every programmer's "toolbox."

**Duplik**—One of the first laws of computer programming is to retain duplicate copies of all of your programs. With DUPLIK, you'll be able to make and/or compare copies of BASIC, source assembler, and machine-language programs. If you have more than one program on a cassette. DUPLIK will enable you to load and save them all by using a single command—without merging. And all of the above can be performed on your Level I cassettes while you're using your Level II machine!

**Renum**—Never again will you have to leave out that new routine or feature because you lack available line numbers. RENUM will renumber your Level I or Level II programs by whatever increments you specify—including GOTOs and GOSUBs!

0081R ..... \$7.95

## TRS-80 UTILITY II

The second in a series of programs designed to help the programmer, Utility II will add unprecedented flexibility to your BASIC programs, by allowing you to combine them with other BASIC programs or with machine-language programs or routines.

**CFETCH**—After you have renumbered your programs using RENUM (see Utility I) you can use the CFETCH program to merge your consecutively numbered BASIC programs. CFETCH also allows you to search a program for its file name, without merging it with the resident BASIC program.

**CWRITE**—This powerful program allows you to merge one or more machine-language programs with other machine-language programs or with a BASIC program. Merged programs can then be loaded with a single command. CWRITE also makes it possible for you to obtain a general checksum (impossible to do when CLOADING a BASIC program) and also allows you to load programs in non-consecutive locations within the memory.

0076R ..... \$7.95

## KNIGHT'S QUEST/ROBOT CHASE/HORSE RACE

This varied package of one-player games will give you hours of fun • **Knight's Quest**—Battle demons to gain treasure and become a full-fledged knight. • **Robot Chase**—Destroy the deadly robots without electrocuting yourself. • **Horse Race**—Place your bet and cheer your horse to the finish line. These programs require a TRS-80 Level I 16K.

J0003R ..... \$7.95

## DESTROY ALL SUBS/GUNBOATS/BOMBER

This package of three programs is fun for the whole family. Included are: • **Destroy All Subs**—Hunt down enemy subs while avoiding mines and torpedoes. A one-player game. • **Gunboats**—One or two players can try to blow each other's ships out of the water. • **Bomber**—Carefully release your bomb to destroy the moving submarine. A one-player game.

To enjoy these programs, you'll need a TRS-80 Level I 4K.

0021R ..... \$7.95



## SPACE TREK IV

Trade or wage war on a planetary scale. This package includes:  
 • **Stellar Wars**—Engage and destroy Tie fighters in your attack on the Death Star. For one player. • **Population Simulation**—A two-player game where you control the economy of two neighboring planets. You decide, guns or butter, with your TRS-80 Level II 16K.

0034R ..... \$7.95

## HOUSEHOLD ACCOUNTANT

Let your TRS-80 earn its keep by handling many of your daily calculations—saving you time and money.

**Budget and Expense Analysis**—It's a proven fact that a well thought out budget program saves money. Surprisingly though, many families avoid them like the plague, simply because of the time and headaches involved in maintaining them. With the Budget and Expense Analysis program from Instant Software, you and your family can start saving money today—in the time it takes to run the program.

The program features nine separate sections for listing income and expenses, and provides for one-month and three-month reviews and yearly totals.

**Life Insurance Cost Comparison**—Do you know the difference between term and whole-life insurance? The Life Insurance Cost Comparison program can show you which policy is the best for the money. From data input by you, the program will store and display up to six different actual cost comparisons that can turn an insurance salesman's rhetoric into hard numbers.

**Date Book**—You need never forget an important anniversary or birthday again. The Date Book program turns your computer into a personal secretary who can keep track of all those important dates and appointments, and display them at the touch of a finger—and it's already preprogrammed to remember all major holidays.

0069R ..... \$7.95

## DEMO I

This package is just the thing to show your friends what your TRS-80 can do. Included are: • **Computer Composer**—Compose and play music using only a standard AM radio. • **Baseball**—Play baseball with your computer while it does the scorekeeping. • **Horse Race**—Place your bet and cheer your pony to the winner's circle. • **ESP**—Test your powers of extra-sensory perception. • **Hi-Lo/Tic-tac-toe**—Guess the secret number or get three in a row. • **Petals Around the Rose**—Can you figure out the secret behind the five dice? • **Slot machine**—Turn your computer into a one-armed bandit. These programs require a TRS-80 Level I 4K

0020R ..... \$7.95

## BASIC AND INTERMEDIATE

### LUNAR LANDER

Bring your lander in under manual control. The Basic version is for beginners; the Intermediate version is more difficult with a choice of landing areas and rugged terrain. For one player with a TRS-80 Level I 4K, Level II 16K.

0001R ..... \$7.95

### BOWLING

Let your TRS-80 set up the pins and keep score. One player can pick up spares and get strikes. For the TRS-80 Level I 4K, Level II 16K.

0033R ..... \$7.95

## AIR FLIGHT SIMULATION

Turn your TRS-80 into an airplane. You can practice takeoffs and landings with the benefit of full instrumentation. This one-player simulation requires a TRS-80 Level I 4K, Level II 16K.

0017R ..... \$7.95

## SPACE TREK II

Protect the quadrant from the invading Klingon warships. The Enterprise is equipped with phasers, photon torpedoes, impulse power, and warp drive. It's you alone and your TRS-80 Level I 4K, Level II 16K against the enemy.

0002R ..... \$7.95

## DOODLES AND DISPLAYS I

Throw away that pencil and paper! Here's a mixed bag of programs that not only will let you draw pictures on your computer, but even gives your TRS-80 the chance to show its own artistic abilities!

**Doodle Pad**—The keyboard of your TRS-80 becomes an artist's palette that lets you create your own masterpieces on the screen and store them on cassette for future unveiling.

**Symmetrics**—Remember the kaleidoscope you played with as a child? Symmetrics brings those same hypnotic patterns to the screen of your TRS-80.

**Video Display**—Just follow the bouncing cursor as your TRS-80 draws pictures all on its own!

**Math Curves**—Your computer will put more life into your child's geometry lessons as it plots and displays curves produced by six commonly used geometric formulas.

**Rug Patterns**—Whether you're a craftsman looking for some unusual patterns for rugs, afghans, tablecloths, or blankets—or just the sort who likes to sit back and be entertained—this never-ending stream of unusual patterns is sure to spark your imagination.

0030R ..... \$7.95

## HEX PAWN/SHUTTLE CRAFT

### DOCKING/SPACE CHASE/SEA BATTLE

This four-game package is sure to provide hours of fun for the whole family. • **Hex Pawn**—Turn your TRS-80 into a model of artificial intelligence by playing a simple game. • **Shuttle Craft Docking**—Land your shuttle craft on the starship—even through varying gravity fields. • **Space Chase**—Seek out and destroy the enemy delta that's hidden in the star field. • **Sea Battle**—You must find and destroy the enemy fleet. This package requires a TRS-80 Level I 16K.

0041R ..... \$7.95

## ELECTRONICS I

This package will not only calculate the component values for you, but will also draw a schematic diagram, too. You'll need a TRS-80 Level I 4K, Level II 16K to use: • **Tuned Circuits and Coil Winding**—Design tuned circuits without resorting to cumbersome tables and calculations. • **555 Timer Circuits**—Quickly design astable or monostable timing circuits using this popular IC. • **LM 381 Preamp Design**—Design IC preamps with this low-noise integrated circuit. This package will reduce your designing time and let you build those circuits fast.

0008R ..... \$7.95

## GOLF/CROSSOUT

Have fun with these exciting one-player games. Included are: • **Golf**—You won't need a mashie or putter—or a caddie, for that matter, to enjoy a challenging 18 holes. • **Crossout**—Remove all but the center peg in this puzzle and your neighbors will call you a genius. You'll need a TRS-80 Level I 4K, Level II 16K.

0009R ..... \$7.95

...s, blowouts and dry wells as you battle to become  
...s richest oil tycoon. Two players become the owners  
of competing oil companies as they search for oil and control  
their companies. Requires a TRS-80 4K Level I & II.

0023R ..... \$7.95

## BACKGAMMON/KENO

Why sit alone when you can play these fascinating games with your TRS-80? • **Backgammon**—Play against the computer. Your TRS-80 will give you a steady challenging game that's sure to sharpen your skills. • **Keno**—Enjoy this popular Las Vegas gambling game. Guess the right numbers and win big. You'll need a TRS-80 Level I or II.

0004R ..... \$7.95

## SANTA PARAVIA AND FIUMACCIO

Become the ruler of a medieval city-state as you struggle to create a kingdom. Up to six players can compete to see who will become the King or Queen first. This program requires a TRS-80 Level I & II.

0043R ..... \$7.95

## HAM PACKAGE

We had to call it something, but this package is not only for hams. It's great for any experimenter or technician in need of a dynamic reference of popular electronics formulas:

**Ohm's Law**—Easily performs calculations involving voltage, current, resistance, and power.

**Series and Parallel Calculations**—Find the value for capacitors or resistors in parallel or series circuits.

**Voltage Dropping and Voltage Dividing**—This will give you the value of a dropping resistor and the effective resistance of the load.

**R/C Time Constants**—This section will calculate the resistance, of the load.

**Dipole and Yagi Antennas**—These two programs will compute the dimensions of an antenna to your exact frequency and give you an on-screen display—complete with all measurements!

0007R ..... \$7.95

## BUSINESS PACKAGE I

Keep the books for a small business with your TRS-80 Level I 4K. The six programs included are: • **General Information**—The instructions for using the package. • **Fixed Asset Control**—This will give you a list of your fixed assets and term depreciation. • **Detail Input**—This program lets you create and record your general ledger on tape for fast access. • **Month and Year to Date Merge**—This program will take your monthly ledger data and give you a year to date ledger. • **Profit and Loss**—With this program you can quickly get trial balance and profit and loss statements. • **Year End Balance**—This program will combine all your data from the profit and loss statements into a year end balance sheet. With this package, you can make your TRS-80 a working partner.

0013R ..... \$29.95

## SPACE TREK III

Let yourself go to the far ends of the solar system—and beyond. This package includes: • **Stellar Wars**—Shoot down the Tie fighters and destroy the Death Star. • **Planetary Lander**—Land your spacecraft and plant your flag across the solar system. These one-player games require a TRS-80 Level I 4K.

0031R ..... \$7.95

## CAR RACE/RAT TRAP/ANTIAIRCRAFT

Enjoy these challenging, fun-filled programs: • **Car Race**—You and a friend can race on a choice of two tracks. • **Rat Trap**—Trap the rat in his maze with your two cats. For one player. • **Antiaircraft**—Aim and shoot down the enemy airplane. Requires Level I 4K TRS-80.

0011R ..... \$7.95

## BUSINESS PACKAGE III

This package can change your TRS-80 into a full working partner for any businessman • **Inventory**—Maintain a computer based inventory for a constant inventory system. • **Commissions and Percentages**—Let your computer figure out markup and discount calculations, sales tax and more. This is a perfect timesaving package for any small business. For the TRS-80 Level I 4K.

0061R ..... \$7.95

## THE BIG THREE

**Cave Exploring**—There's excitement at every turn in this fanciful simulation of a trip through an enchanted cave.

Your goal is to locate and bring to the surface as many as possible of the treasures hidden within the cave's many rooms. What makes this trip so challenging is that the booty is being guarded by a murderous dwarf, a green snake, and a ferocious bear! Fortunately, you are provided with a black rod, magic numbers, and keys scattered throughout the caves to aid you in your quest. Sure it's spooky, but don't let that stop you. Either you'll escape with an armload of treasure or die trying!

**Yacht**—Yacht is a two-player game combining elements of strategy and luck. The computer will toss the dice and keep score while you attempt to make the best possible poker-type hands from the dice and complete a list of required dice combinations. Whoever fills in his side of the screen first wins.

**Memory**—Memory is based on a popular television game show.

Each player is shown a grid of 25 numbered squares, and each takes turns picking numbers in an attempt to match the prizes hidden behind the squares. Whichever player makes the match wins the prize. Also included is a "Give One/Take One" match that allows a player to take a prize or give one away to his opponent. Just be sure to concentrate on the board—we do call it memory for nothing!

0010R ..... \$7.95

## FUN PACKAGE

More fun for your computing dollar? Check out this delightful foursome:

**Rocket Pilot**—Your mission is to fly your rocket over the mountain to a safe landing on the other side. Fortunately, you needn't walk back in the event of a crash...just rerun the program and try again.

**Hex I**—If all you had to do was move your man across the board, Hex I would be a simple game. Add some mines, and allow your TRS-80 to send out a man of his own to try to capture yours, and the game gets a little more challenging. Now consider that as soon as you win four games in a row, the computer will play an even more difficult version—with invisible mines—and you have a game that's capable of entertaining children from ages six to sixty! **Missile Attack**—Protect your city from attack! Aim your missiles and shoot the enemy aircraft. Just make sure to get them all, or you'd better start looking for another town.

**Paper-Rock-Scissors**—Just like the game you played as a child. Choose the correct item to outguess the computer. Remember: Paper covers rock, rock breaks scissors and scissors cut paper.

00374 ..... \$7.95

## STATUS OF HOMES/AUTO EXPENSES

Two long-awaited programs that have got to save you money at work or in the home: • **Status of Homes**—This program will allow you to keep track of all the expenses involved in building one house or an entire subdivision. • **Auto Expenses**—Find out exactly what it costs you to drive your car or truck. These programs require a TRS-80 Level I 4K.

0012R ..... \$7.95

## PERSONAL FINANCE

Let your TRS-80 handle all the tedious details the next time you figure your finances: • **Personal Finance I**—With this program you can control your incoming and outgoing expenses. • **Checkbook**—Your TRS-80 can balance your checkbook and keep a detailed list of expenses for tax time. This handy financial control for the home requires only a TRS-80 Level I 4K.

0027R ..... \$7.95

## BOWLING LEAGUE STATISTICS SYSTEM

This package is the answer to the prayers of harried bowling league scorekeepers. The Bowling League Statistics System will keep a computerized list of league data, team data, and data for each bowler. It is extremely flexible and has a total of 16 different options to let you modify the program to suit your league's rules. The program is very easy to use and has extensive "built-in" aids to help you along. Requires TRS-80 Level II 16K.

0056R ..... \$24.95

## FINANCIAL ASSISTANT

**Depreciation Schedule**—This handy program will perform depreciation calculations using any one of five different methods: straight line, sum of years-digits, declining-balance, units of production, and machine hours.

**Loan Amortization Schedule**—Just enter a few essential factors, and your TRS-80 will display a complete breakdown of all costs and the repayment schedule for any loan, showing cost of borrowing, total payments, totals paid to date on interest and principal, and much more.

**Financier**—This indispensable program puts 13 of the most often used financial functions at your fingertips. You'll get fast, accurate figures on investments, perform simple depreciation calculations, and work out the particulars for any loan.

**1% Forecasting**—Use this program to calculate projections on sales, expenses, or any other historical data series. Just enter the figures for the previous one to three years, and your computer will project estimated figures for the next three months.

0072R ..... \$7.95

## MODEL ROCKET ANALYZER AND PRE-FLIGHT CHECK

**Model Rocket Flight History Prediction**—This handy program will compute the flight characteristics and performance for virtually any model rocket. Preprogrammed engine and body tube data covers Estes, Centuri, Flight Systems, A.V.I., Astroport, C.M.R., and Kopter products. If you prefer to build and fly rockets of your own design, the program will also utilize information supplied by you to estimate the performance of your individual creation.

**Before you launch your rocket, you'll need an accurate, up-to-the-minute forecast of weather conditions in your area. With Weather Forecaster, just enter your present location, your region's average temperatures for the months of July and January, and the current barometric pressure. Your TRS-80 will then compute the weather conditions for your area.**

0024R ..... \$7.95

## KEYNOTE

Features a music synthesizing program. Allows you to hear any type of music in slow, medium, or fast tempo across a span of almost five octaves and with notes ranging up to 1/32 duration.

TRS-80 LEVEL II  
02903 ..... \$12.95

## GRIDIRON: MICROFOOTBALL GAME

Features a real-time, pad-crunching version of the American game of football. Identical to actual football, except now, you're the #1 player.

TRS-80 LEVEL II  
03003 ..... \$12.95

## MICROTYPING

Features the "touch method" of learning to type. Enables you to learn or to improve your computer typing skills. Divided into 4 levels.

TRS-80 LEVEL II  
02403 ..... \$9.95  
DOS + APPARAT 40 TRACK  
DAPT ..... \$99.95  
DOS + APPARAT 35 TRACK  
DAPT35 ..... \$109.95  
DOS + APPARAT 70  
DAPT70 ..... \$195.95

## NEW GAMES FEATURING ANIMATED GRAPHICS AND SOUND. BY LEO CHRISTOPHERSON AND LICENSED FROM 80-US.

Here is a group of games which feature "impossibly sophisticated" animation and sound. Using conventional techniques, these programs would have required as much as 32K of memory, instead, they all will run in 16K machines. Leo Christopherson has found methods of packing strings in one third the space that they previously occupied. He then went on to pack the machine language routines in the same way. Now, with this technique and others, he has created games the like of which have never been seen on a TRS-80. Below are the details of these exciting programs.

**ANDROID NIM II** by Leo Christopherson (M.H.S./80-US) The well known game of NIM will never be the same. In this version there are three robots (ANDROIDS) whose task it is to eliminate those ANDROIDS that you or the computer have decided to "remove." This is done with a lot of "talking" and moving about. But, watch out! The computer gets nasty if you win.

TRS-80 VERSION—LEVEL II/16K  
T2G125 ..... \$14.95

**SNAKE EGGS** by Leo Christopherson (M.H.S./80-US) Here three snakes play a game which is difficult to describe. Loosely based on the game of 21 (times two), they lay eggs which punch out 21 lines. A 21 gives you a "Snake Egg," an instant win, and over 21 gives you a "Scrambled Egg" where you lose. There are remarks passed back and forth between the snakes which are translated for you. At the start there is a "Call to Post," a Chopin Funeral Dirge if you loose and a Sousa March if you win!

TRS-80 VERSION—LEVEL II/16K  
T2G126 ..... \$14.95

## CHRISTOPHERSON GAMES CONT'D

**LIFE TWO** by Leo Christopherson (M.H.S./80-US) There are two games of LIFE in this one 16K program. A "convention" game of LIFE that features 100 GENERATIONS PER MINUTE! The second, is the BATTLE OF LIFE using four of Christopherson's little "creatures", where up to four players can set up the game to see which of these "creatures" will survive.

TRS-80 VERSION—LEVEL II/16K  
**T2G127** ..... \$14.95

**CUBES** by Leo Christopherson (M.H.S./80-US) This game is based on the cube game "instant insanity" where you have to set four cubes with different colors on each face up in such a way that no two colors are adjacent to each other no matter which set of faces you look at. In this version, you set the cubes up by telling the computer which color is on the face of each side of each cube. Then you watch as the computer takes a trial and error approach to solving the problem. "Instant Insanity" is a trademark of Parker Brothers.

TRS-80 VERSION—LEVEL II/16K  
**T2G128** ..... \$14.95

**TRS-80 DISK LIBRARY "C"** (M.H.S./80-US) Android Nim II, Snake Eggs, Lifetwo and Cubes all on one Disk at a 10% savings.

TRS-80 VERSION—LEVEL II/32-48K-W/DISK  
**T4L104** ..... \$37.95



## RSL-(LIFE)

This is a machine language version of the game. It takes only two seconds between generations. You key in the starting pattern which can be saved on tape to be run again.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G113** ..... \$14.95

## TRS-80 4K LEVEL I GAMES-1

Battling DEATHSTARS, an exciting two player realtime graphics game. HANGMAN challenges you to guess the computer's word before you're hung. LUNAR LANDER in which you try to land safely on the moon. Kid's MATH RACE teaches simple arithmetic. Or play CHECKERS against your TRS-80.

TRS-80 VERSION—LEVEL I/4K  
**T1G147** ..... \$ 7.95

## BOARD GAMES-1

(6 Games). BACKGAMMON—the classic game. QUBIC—try to get 4 pieces in a row on a 3-d board. FLIP DISC—logic game similar to Othello. WUMPUS I AND II—hunt the Wumpus while avoiding pits, bats and other hazards. MUGWUMP—find it in hiding.

TRS-80 VERSION—LEVEL II/16K  
**T2G148** ..... \$ 7.95

## SPACE GAMES

(6 Games). ULTRA TREK—keep the galaxy safe from invading aliens. ROMULAN—outwit the sneaky invaders. STAR WARS—get TIE fighters in your blaster sights. STAR LANES—the ultimate game of barter and trading.

TRS-80 VERSION—LEVEL II/16K  
**T2G149** ..... \$ 7.95

## ADVENTURE

(2 Versions). Explore an almost endless maze of caverns with incredible riches and hazards. You'll run into unusual creatures, quicksand, diamonds and rubies, a rusty ax and many other strange and beautiful things. Challenging and fun for all ages.

TRS-80 VERSION—LEVEL II/16K  
**T2G150** ..... \$14.95

## MASTERMIND II

By Lance Micklus (T.S.E.)

Lots of people have written digital MASTERMIND programs that create the code and give you the clues. This one will also let you make the code and give the clues. You can play either way or take turns with the computer. 10 rounds make up a game, and at the end of each round, player averages are displayed. Because this is a machine language program, it takes the computer 3 seconds or less to come up with a guess. Both Level I and II versions are supplied. Level I loads with the CLOAD command, and Level II with the SYSTEM command (file name MSTR). Loads into memory addresses 5000 to 7FF0 and thus requires 16K of memory.

TRS-80 VERSION—LEVEL I/16K LEVEL II/16K  
**T3G117** ..... \$9.95

## PORK BARREL

By Rev. George Blank (T.S.E.)

"The game that Congressmen never stop playing...re-election". Put yourself in the shoes of an aspiring Congressman. Given a breakdown of your constituency by percentages; white collar, retired, farm worker, unemployed, welfare, blue collar, elderly, and many more, how would you vote on various sensitive issues? In PORK BARREL, you get to put your vote where your mouth is. Don't worry, the voters in your district will let you know how they feel!

TRS-80 VERSION—LEVEL II/16K  
**T2G118** ..... \$9.95

## CRIBBAGE

By Roger Robitaille (T.S.E.)

That's right, one of the oldest and most enduring of all card games is now available for your TRS-80! No more waiting around for a partner; this is a you vs. computer game that's ready to play whenever you are and according to Hoyle's book of card rules. No cribbage board needed since your computer keeps track of the score. With this program you're guaranteed a surprisingly worthy opponent.

TRS-80 VERSION—LEVEL I/16K LEVEL II/16K  
**T3G153** ..... \$9.95

## MAGIC ISLE

By Tim Quinlin (M.H.S.)

This is a fantasy economic simulation where you are the ruler of the Magic Isle, where sorcery and mythological creatures are the order of the day. The Magic Isle is beset with evil curses, plagues, evil monsters and devastating storms, droughts, etc. Attacks by enemy soldiers, barbarians and pirates also have to be coped with.

Your duties involve the distribution of manpower, the planting of crops and decisions about entering into mutual aid pacts with neighbors or buying protection from adepts, strange knights, etc.

This is a fascinating game which should never be boring. Effectively, there are hundreds of sentences of informative readout.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G1D4** ..... \$ 7.95

**YACHT RACE****By John Greenwood (M.H.S.)**

This is a turn-of-the-century board game that involves skill and strategy. This is a game the player will not tire of quickly. The object of YACHT RACE is to sail around a course with three buoys returning to the start-finish line. The course is laid out on a chart with islands and peninsulas. Includes sound.

TRS-80 VERSION—LEVEL II/16K  
**T2G155** ..... \$7.95

**MIND BOGGLE****By John Greenwood (M.H.S.)**

This is a new, real time word game that is entertaining, educational and challenging. The object of the game is to guess a hidden word or number based on clues given by the computer. The clues are in the form of "cows" and "bulls". For each guess the player makes, the computer will award him one "cow" for each letter or number that is guessed correctly but is in the wrong position. For each correct guess in the right position he gets a "bull." When he gets all "bulls" he wins. Play against the computer or another player. Includes sound.

TRS-80 VERSION—LEVEL II/16K  
**T2G156** ..... \$7.95

**TREASURE HUNT****By Lance Mickius (T.S.E.)**

This is a challenge, so don't cheat and read the program listing. Use your imagination. You are exploring caves and trying to find 20 treasures. Some are easy to get, others are very difficult because you have to figure out how. When you first play, you will probably make a lot of mistakes. The more you play this game, the more secrets you will discover, and thus, the more treasure you will find. All 20 treasures can be found in about an hour of play if you know what you're doing. Your first problem is to draw a map of the caves. Good luck, you're gonna need it.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G129** ..... \$7.95

**BINGO CALLING PROGRAM****By Tim Quinlan (M.H.S.)**

This is a great program for the family or small groups. It picks a number and this displays it in screen size characters. It then displays a table of all the calls up to that time. When someone has a bingo, there's a number checking routine at the end.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G106** ..... \$7.95

**TAROT CARDS****By Franck Rowlett (T.S.E.)**

This is probably the best future gazing type program I have seen. Unlike many programs in the field whose appeal wears out quickly, the combination of graphics and presentation leads to continuing use. Since the dawn of civilization man has sought a better explanation of the mysterious forces that seem to govern our lives. Learn the secrets of ancient Egypt. Benefit from the special knowledge once reserved for High Priests and conquering Kings. Or better yet, if you don't believe in any of that, just bring it out the next time someone you know says, "Gee, it's a nice looking computer. What does it do?"

TRS-80 VERSION—LEVEL II/16K LEVEL II/16K  
**T3G152** ..... \$7.95

**POLLUTION (C.E.)**

An economic simulation adapted from the program "KING". In this program you make decisions on farming, industry, education, combating etc. See how well you'll do during your reign as "KING".

TRS-80 VERSION—LEVEL I/16K LEVEL II/16K  
**T3G130** ..... \$7.95

**BARRACADE (S.S.S.)**

This game is similar to the popular arcade game, BREAKOUT. It is written in machine language and allows you to set up the parameters of the game (paddle size, speed, number of balls, etc.). The object of the game is to break through the BARRACADE with a limited number of balls.

TRS-80 VERSION—LEVEL I/16K LEVEL II/16K  
**T3G114** ..... \$14.95

**SLOT MACHINE II****By Steve McGarry (M.H.S.)**

This is a slot machine game that features animated graphics and sound—get the feel of the real thing.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G112** ..... \$14.95

**AIR RAID (S.S.S.)**

A real-time arcade type game where you try to shoot down different size planes as they fly across the screen. This is a fast paced machine language program that keeps score, saves the highest score and provides different levels of play.

TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3G112** ..... \$14.95

**GALACTIC BLOCKADE RUNNER****By Time Quinlan (M.H.S.)**

You are the captain of a federation starship battle cruiser. Your mission is to run an enemy blockade and to deliver vital supplies to federation forces under siege on Planet M/5. You control your ship's course and speed along with the firing of its weapons. You will have to fight battle after battle successfully to reach your destination. Besides the enemy, you will have to cope with ship malfunctions and ion storms. This is a sophisticated game providing ship status reports, sensor scans and graphic displays of the enemy ship, weapons tracks and shield hits. It also displays appropriate warnings and messages. You'll find this game faster paced and more challenging than many of the Star Treks on the market.

TRS-80 VERSION—LEVEL I/4K, LEVEL II/16K  
**T3G101** ..... \$9.95  
 PET VERSION—8K  
**P2G101** ..... \$9.95  
 APPLE II VERSION—16K  
**A2G101** ..... \$9.95

**HOW TO DO IT IN 30 MINUTES-  
NOT 30 DAYS**

RADEX-18 is a powerful database manager especially written for the TRS-80. It will read any file it creates that you can describe. Its code may be used in any of your programs. It is compact and you don't have to write one byte of code to use its full power. Here's a problem—Imagine that you need to create a random access file with 30 fields; some are alphanumeric, some integer, some single and double precision. You need several reports generated from the file and you will need to have six different programs access the file. In addition you will have to write routines to update the file, add records, delete records,

## DO IT CONT'D

records and display records. Then you must write the bookkeeping routines, debug test and document and have it ready in 30 days! Here is the rest of the problem you have to solve...you need to keep over 2000 records and each disk will only support 600 with the file layout that you need! With RADEX-10, you can have the job done in 30 minutes—not 30 days. DISK SPANNING is automatic. Reports and mailing labels are built-in as regular features of the REPORT GENERATOR. It's so easy. The program is menu driven with generous prompting in PLAIN ENGLISH. NO COMPUTER jargon. You will describe the file to RADEX using English. You will describe your reports to the RADEX REPORT GENERATOR AND YOU'LL BE FINISHED IN LESS THAN 30 MINUTES—ready to start using your file and reports! Its uses are unlimited. Build a database of databases. Each one can be unique, and RADEX will read every single file you create. Use it for business, scientific, home, hobby, accounting, inventory, mail lists—you name it. It will never take up more than 6K of RAM for any program module, so you will have plenty of room for your own programs that you wish to interface with RADEX. RADEX-10 documentation is written with you in mind. It is complete and leads you through the creation of files and reports as well as file maintenance. Whether your database requirements are for professional or hobby; for home or business, for scientific or educational use; RADEX-10 will give you TRS-80 instant access to a database that fits your every requirement because YOU can design it to fit your personal needs.

RADEX-10 PROGRAM PACKAGE COMPLETE WITH REPORT GENERATOR AND DOCUMENTATION.

RADEX10 ..... \$99.95

### MLUP-1

Machine language utility package no. 1 • TRS-80 level II or disc BASIC (16K, 32K, 48K) • Six machine language routines to make your TRS-80 more efficient, versatile and trouble-free • Keyboard debounce repeat • Formatted input • Upward scrolling • Downward scrolling • Shift & delete • Shift and insert.

MLUP1 ..... \$25.95

### BOOTSTRAP™

Since the first programmer looked at the first TRS-80\*, one failing in the system has been evident. Before the system can be used by the end user, it must be programmed for the task at hand. And since the programmer must know how to program, the computer's usefulness was limited. Even when a program could be supplied on tape, and in fact, which tape to load, without any prompts to guide him or her through the task. When the disk system became available the TRS-80 could do a lot more, but it became incredibly more complex. Of course now programs could be chained, and so could files, but when turning on the system the operator still had to wend his way through a DOS with limited prompting and even if he succeeded the first time, some error messages could put him right back into DOS without any instructions as to how he could get out. Well, BOOTSTRAP solves that problem. Though BOOTSTRAP is written in Basic, what it does is only just short of magic. BOOTSTRAP will take you, the programmer, through all the DOS and BASIC prompts necessary to get your program up and running, and save your responses in a machine language file. Then all the end user will have to do in order to have the computer pace itself through all the start-up procedures, through all those complicated DOS and BASIC prompts, right through loading of high-memory machine-language programs, renames, appends, just about anything you can do in BASIC or DOS (except BACKUP or FORMAT), is simply TURN ON THE COMPUTER. THAT'S RIGHT. SIMPLY TURN ON THE COMPUTER.

BOOTSTRAP ..... \$

## INVENTORY (MODULAR)

By Roger Robitaille (T.S.E.)

This inventory program runs on II Payroll-1 Microcomputers. Its construction permits the user to create subroutines customized to his own purpose. One of the main features of this program allows for the inclusion of Alphabetic information and a Data Index Code in the form of data statements within the program. The result is performance and flexibility unmatched by our other Inventory Software. **Reports**—user specifies up to three numeric and either or both alpha informations to be listed and can be vendor specific. **Cost/value Summary**—searches all stock areas and reports Cost/value Quantity, Total Value by line item and Grand Total. **Recorder Search**—compares current stock level against specific reorder point and displays on screen all line items in need of reorder, along with tentative reorder information. **Index**—uses arbitrary file numbers reflecting the order in which the data codes are stored. Index will reveal the file names and file numbers in groups of 24 for use in other data calls. **Detailed Rept**—every stock file is callable by file number to reveal all memory information regarding that item. **Data Change**—updates Data Base.

TRS-80 VERSION—LEVEL II/16K

T2B101 ..... \$19.95

## SMALL BUSINESS BOOKKEEPING

By Roger Bobitaille

This bookkeeping system is based on the nationally known DOME BOOKKEEPING RECORD. The only aspect not covered by this program is payroll. Two record tapes are used in conjunction with this program. One to record the year to date and the other to store check entries on a weekly basis.

TRS-80 VERSION—LEVEL II/16K

T3B102 ..... \$14.95

## OSBORNE BUSINESS PACKAGE FOR THE TRS-80

This package consist of accounts receivable, accounts payable and general ledger. It is fully integrated and based on the OSBORNE PACKAGE which has been running on the WANG microcomputer for five years. This system accurately follows the OSBORNE books that can be purchased at most computer stores. System requires a TRS-80 with 48K of memory, 3 disk drives, a 132 column printer and the OSBORNE books.

T5B108 ..... \$349.95

INDIVIDUAL PACKAGES (SPECIFY PACKAGE)

T5108IP ..... \$125.95

MANUAL ONLY

T5B108M ..... \$ 9.95

OSBORNE PAYROLL WITH COST ACCOUNTING

T5B112 ..... \$125.95

OSBORNE BOOKS (A/R & AP—GEN. LEDGER—PAYROLL)

T5B112B ..... \$ 19.95

## CLIENT BILLING PACKAGE FOR THE TRS-80

This system keeps track of activities, hours, and dollars (work in progress) for client billing purposes. The system is designed for the small to medium sized accounting or law firm. It can support 999 clients, 99 precoded activities, and 1200 outstanding transactions. All information is available to the user through formatted video displays and printer reports. System requirements are a TRS-80 with 48K of memory, 3 disk drives and a printer.

T5B113 ..... \$495.95

MANUAL ONLY

T5B113M ..... \$ 19.95

## SMALL BUSINESS BOOKKEEPING ON DISK (TRS-80)

This is the same bookkeeping system described elsewhere in this catalogue (T3B102) but on disk with disk I/O.

T4B102 ..... \$24.95

**PILOT—THE EDUCATIONAL LANGUAGE**

**By Bob Edison**  
 PILOT was originally developed by John Starkweather as an author language for computer-aided instruction (CAI). Since then many versions have appeared on the market but few have both input and output capability along with a build-in editor. So really PILOT for the TRS-80 consists of three separate software modules; the executive, editor and interpreter. The executive provides the selection of what function you want to perform, that is, load or save a PILOT program, print the program on the printer, run a PILOT program or enter the PILOT editor. The editor is line-oriented and gives you fill editing capabilities on line by lines bases. Finally the interpreter is pretty much the one that was developed by Dean Brown of Zilog, Inc. maker of the Z-80 microprocessor chip in your TRS-80. Dean's interpreter was designed to run on a fairly expensive software development system so there was considerable input and output differences between the TRS-80 and Zilog's system. In fact, Dean has been very instrumental in developing PILOT and PILOT programs over the past few years. The sample programs included with PILOT were written by Phyllis Cole (In and Out, Godlocks) and Bob Edison (Guessing Game). What has made PILOT increasingly popular among educators is that is it word oriented rather than mathematically orient like BASIC. It's extremely easy to write a conversational program in PILOT in fact most children can write a small PILOT program without difficulty. The fact is PILOT reduces the number of commands to a minimum but also simplifies programming to a straightforward style.

- MEMBERSHIP IN PILOT USERS GROUP INCLUDED.  
 TRS-80 VERSION—LEVEL II/16K  
**T2E101** ..... \$14.95  
 TRS-80 VERSION—LEVEL II/16-48K-W/DISK  
**T4E101** ..... \$24.95

**PILOT TUTORIAL**

**By Dave Lindbergh (M.H.S.)**  
 This is a must if you purchase one of our versions of PILOT. It will instruct you in the use of the PILOT Interpreter's Commands and it's Editor. This series of programs is written in PILOT and includes drills at the end of each section to test you on what you have just studied.  
 TRS-80 VERSION—LEVEL II/16K-W/PILOT  
**T2E102** ..... \$14.95  
 TRS-80 VERSION—LEVEL II/16K-48K-W/DISK & PILOT  
**T4E102** ..... \$24.95

**PILOT QUIZZES**

**By Bob Edison (M.H.S.)**  
 Here's a series of seven (7) quizzes covering a variety of subject matter and will serve as excellent examples of PILOT's use in CAI (Computer Assisted Instruction).  
 TRS-80 VERSION—LEVEL II/16K-W/PILOT  
**T2E103** ..... \$ 7.95  
 TRS-80 VERSION—LEVEL II/32-48K-W/DISK  
**T4E106** ..... \$49.95

**PILOT/PILOT TUTORIAL (M.H.S.)**

Get both the PILOT Interpreter and the PILOT TUTORIAL in one package at a substantial savings.  
 TRS-80 VERSION—LEVEL II/16K  
**T2E106** ..... \$24.95  
 TRS-80 VERSION—LEVEL II 32-48K-W/DISK  
**T4E106** ..... \$49.95

**ECOLOGY SIMULATION-1 (C.C.S.)**

**(4 Programs)**. Simulations adapted from Huntington II Project. POP—explore three population growth models. STERL—vary use of pesticides vs. release of sterile males to control fly pest population. TAG—Use "tagging-and-recovery" sampling technique to estimate the number of fish in a pond. BUFFALO—Manage a Buffalo herd to allow hunting while keeping buffalo from becoming extinct. Comes complete with extensive resource manual.  
 TRS-80 VERSION—LEVEL II/16K  
**T2E105** ..... \$24.95

**MOVING SIGNBOARD (C.E.)**

This machine language program is designed to use the TRS-80 as a display device. The user may type-in up to a full screen of text, store it in memory and then cause it to crawl across the screen in the fashion of an electronic marquee.  
 TRS-80 VERSION—LEVEL I/4K LEVEL II/16K  
**T3U110** ..... \$ 9.95

**FILE HANDLING (C.E.)**

A must for file handling in BASIC. Will list names in file, search/edit file, record file on cassette. One use would be record names and phone numbers, either one callable by the other.  
 TRS-80 VERSION—LEVEL II/16K  
**T2U111** ..... \$ 9.95

**ESP-1/8080 EDITOR/ASSEMBLER (S.S.S.)**

Here is a resident operating system that lets you create, assemble, execute and debug programs using Intel 8080 assembly language mnemonics.  
 TRS-80 VERSION—LEVEL II/16K LEVEL II/16K  
**T3U106** ..... \$29.95

**TFEET**

**By Bob Edison (M.H.S.)**  
 This utility program allows you to relocate T-BUG anywhere in available memory. It is a short machine language program that gives your copy of T-BUG resident capability.  
 TRS-80 VERSION—LEVEL II/4K  
**T2U117** ..... \$ 9.95

**THE ELECTRIC PAINTBRUSH**

**By KJen Anderson (P.S.)**  
 For the TRS-80. Create the most dazzling graphics displays you have ever seen with a minimum of effort. The ELECTRIC PAINTBRUSH is actually a simple "language" in which you can write "programs" directing your paintbrush around the screen—drawing lines, turning corners, changing white to black, etc. Once defined, these programs may be called by other programs. The machine language interpreter executes your programs almost instantaneously.  
 TRS-80 VERSION—LEVEL I/4K LEVEL II/4K  
**T3U118** ..... \$14.95

**MUSIC MASTER**

**By Dave Lindbergh (M.H.S.)**  
 Use your TRS-80 as a programmed organ! All you have to do is enter sheet music and the computer will then compile and play it. Once entered you can save and load your compositions. Includes sample music and complete instructions.  
 TRS-80 VERSION—LEVEL II/16K  
**T2H106** ..... \$14.95

## BIG PRINT

By Don Coon (M.H.S.)

This program allows you to format up to five lines of large characters up to the width of the screen in width. This versatile program may be used as a subroutine in display programs for advertising, as an attention getter etc.

TRS-80 VERSION—LEVEL II/14K  
**T2U102** ..... \$ 7.95

## MICRO-TEXT EDITOR

By Don Coon (M.H.S.)

Here's a text editing program for your Level II TRS-80. Not the Electric Pencil, but an excellent buy for the money. This program features a non-destructible cursor, full graphics capability, and versatile editing options. You can save and load the screen to tape or dump to your printer. Uses 3K of memory and is written in machine language. Full instructions included.

TRS-80 VERSION—LEVEL II/4K-W/PRINTER  
**T2U101** ..... \$9.95

## DISK MUSIC MASTER

By Dave Lindbergh (M.H.S.)

This is the same program as the cassette version, but besides being on disk it also features disk I/O. Just think of the number of selections that you can save on a disk for instant recall. In fact, we've filled the rest of this disk with a variety of music selections. Comes with complete instructions.

TRS-80 VERSION—LEVEL II/16-48K-W/DISK  
**T4H106** ..... \$24.95

## TRS-80 DISK LIBRARY "A" (M.H.S.)

On one disk—Galactic Blockade Runner, Magic Isle, Othello III, Demo, Bingo Calling Program, SCI-FI Sampler (see elsewhere for descriptions). Also, an Enterprise Graphic, a Snoopy Graphic and a Russian Roulette Game. Save 20% over buying these individually.

TRS-80 VERSION—LEVEL II/32-48K-W/DISK  
**T4L102** ..... \$39.95

## TRS-80 DISK LIBRARY "B" (M.H.S.)

On one disk—Biorhythm, Micro-Text Editor, Bigprint, Slot Machine, R/T Lunar Lander and Personal Finance. Save 15%.

TRS-80 VERSION—LEVEL II/32-48K-W/DISK  
**T4L103** ..... \$39.95

## NEWDOS/BEST OF APPARAT

This disk package is a must for owners of a TRS-80 disk based system. It contains NEWDOS, DIRCHECK, DISASSEM, EDTASM, LEVEL I IN LEVEL II, LMOFFSET and SUPERZAP. NEWDOS provides fixes for many of TRS DOS 2.1's problems. Besides this, many enhancements to BASIC have been added including built in renumbering, some abbreviated commands, scrolling of listings up or down, screen printing (dumps contents of screen to printer), clear up keyboard bounce, the append now works, direct call DOS without leaving BASIC (display directory etc.), display all occurrences of variables used etc. With NEWDOS you also get DIRCHECK which tests and lists disk directories, DISASSEM which is a disassembler, EDTASM which allows you to use your RADIO SHACK EDITOR-ASSEMBLER on disk with disk I/O, LEVEL I IN LEVEL II which allows you to use or create LEVEL I programs and also save or retrieve them from disk using LV1DSKSL, LMOFFSET helps save and load machine language tapes from disk even if in same memory as DOS, and finally SUPERZAP which allows you to display, print and MODIFY memory or DISKS. All this comes with over 30 pages of documentation and presumes ownerships of TRSDOS 2.1 and the RADIO SHACK EDITOR-ASSEMBLER. Don't wait another day to make all these wonderful additions to your system.

TRS-80 VERSION—LEVEL II/16K-W/DISK  
**T4U120** ..... \$99.95

## TRS-80 FORTRAN (MICROSOFT)

This package is supplied on two minidiskettes and requires a 32K system with one disk drive. Includes the finest Z-80 development software available: Z-80 MACRO-ASSEMBLER, VERSATILE TEXT EDITOR and LINKING LOADER.

TRS-80 VERSION—LEVEL II 32K-48K-W/DISK  
**T4U116** ..... \$299.95

## TRS-80 CP/M (S.S.S.)

At last, CP/M is available for the TRS-80! Long a standard for software development and interchange for all the "other" 8080/Z-80 computers on the market, CP/M will now provide the same environment for the TRS-80. CP/M is a file-oriented disk operating system that provides a common set of utilities for program development and operation. There are six built in commands plus utilities called in from disk. CP/M will run on a TRS-80 with as little as 16K of memory and one disk drive. Comes complete with six manuals. CP/M is a registered trade mark of Digital Research.

TRS-80 VERSION—LEVEL II/16L-W/DISK  
**T4U119** ..... \$139.95

## RENUMBER

By Mark Falk (M.H.S.)

No space between line numbers to insert more code? Want to make your listings look neater? Well have we got a program for you! This is a machine language program that can be loaded at the top of a 4K, 16K, 32K or 48K memory using TRS-80 level 2's system function. Renumbers your programs in seconds!

TRS-80 VERSION—LEVEL II/4-48K  
**T2U103** ..... \$ 14.95

TRS-80 VERSION—LEVEL II/16-48L-W/DISK  
**T4U103** ..... \$ 19.95

## DCV-1 (S.S.S.)

This is a utility routine that will allow nearly any LEVEL 2 SYSTEM tape to be converted into a disk file which can be executed directly from TRSDOS. This is accomplished by a simple but elegant routine that allows programs that normally reside in the same memory as the DOS to be loaded from disk to high memory where they don't interfere with the DOS, then moves them down into their normal operating space after the DOS is no longer necessary.

TRS-80 VERSION—LEVEL II/16-48K-W/DISK  
**T4U105** ..... \$ 9.95

## RSM-2(D) (S.S.S.)

A disk based machine language monitor and disassembler. The monitor provides you with over two dozen commands which interact directly with the Z-80 processor in your TRS-80. Examine your ROMS, test your RAMS, enter and execute machine language routines. This version reads and writes system tapes, has a Z-80 breakpoint routine, reads and writes desk sectors directly and outputs to a printer. Includes three versions that load at the top of 16K, 32K or 48K.

TRS-80 VERSION—LEVEL II/16K  
**T2U104** ..... \$ 26.95

TRS-80 VERSION—LEVEL II/16K-48K-W/DISK  
**T4U104** ..... \$ 29.95

## SYSCOP

By Dave Lindbergh (M.H.S.)

Do you have SYSTEM tapes that are hard to load? Do you wish you were able to back them up in case something happened to the original? Well, here's just what you've been looking for! With this utility program, all you have to do is load it like any other SYSTEM tape. After that you just load the SYSTEM tape you wish to make a copy of. You don't need to know the FILE NAME, the starting or ending addresses or anything! Complete instructions included.

TRS-80 VERSION—LEVEL II/4K  
**T2U115** ..... \$ 9.95



## NAME AND ADDRESS SYSTEM

By Bill Driscoll (M.H.S./S.B.S.G.)

This disk based mailing list package was designed for use on the TRS-80 with two disk drives, 32K of memory and a printer. It will handle 500-1000 names per disk. With this system, small businessmen can keep track of vendors and customers. Churches, clubs and other organizations can keep track of name and address information. Separate files can be set up, or all names can be kept on one master file. You can enter, update, delete, search, sort (by zip code), merge, extract (to form new file as a subset of a master file) and print one, two or three up labels. You can search through the file for information on any field: NAME, CITY, STATE, ZIP, PHONE, CODES, RECORD # or DATE. Comes with 45 pages of documentation.

TRS-80 VERSION—LEVEL II/32K-W/2 DISK & PRINTER  
**T5B104** ..... \$99.95

## FILE MANAGEMENT SYSTEM (M.H.S./S.B.S.G.)

This system allows you to define and create files for your own use. You can sort these files in ascending or descending order on three separate fields; you can scan the files; you can summarize on \$ values. Any number of files can be created with this system and stored on disk. This is ideal for anyone with specialized storage needs or a desire for unique files. It has been applied in the past to fixed assets, phone #'s, names, cataloging etc. Comes with 12 pages of documentation.

TRS-80 VERSION—LEVEL II/32K-W/DISK  
**T4B105** ..... \$49.95

## INVENTORY SYSTEM II

By Bill Driscoll (M.H.S./S.B.S.G.)

This inventory system was written for the TRS-80 with at least two disk drives and 32K of memory. It will handle up to 1000 items per disk, is menu driven with full screen prompting and delivers the following reports: • ACTIVITY • COMPLETE INVENTORY LISTINGS • SELECTED INVENTORY LISTINGS

## DISCOTECH™ PAYROLL-1

DISCO-TECH's Payroll-1 program for the TRS-80 micro-computer is an easy-to-use system developed with the user in mind. You don't have to know much at all about computers in order to use Payroll-1. Simply start the machine and go to work on your company payroll. Each step in the system is clearly spelled out in easy-reading English and graphic displays on the video screen guide you surely through the well-defined procedure. Payroll-1 lets you hire, maintain, promote, terminate, and reinstate up to a total 150 employees at any time, without disturbing your customary procedures. Input errors are easily detected and corrected with Payroll-1. And you can rely on DISCO-TECH to provide full support for all of its software. Payroll-1 calculates totals for each employee and the entire company for all deductions; regula, overtime, and total hours; regular, overtime, and total gross pay; and for net pay. Totals of each of these categories are accumulated for current pay period, month-to-date, quarter-to-date, and year-to-date. Payroll-1 provides printed output for individual employee totals; company totals, for computing depositaries; employee information, for W-2, etc; and for paychecks (check-printing available only in Payroll-2, please see below).

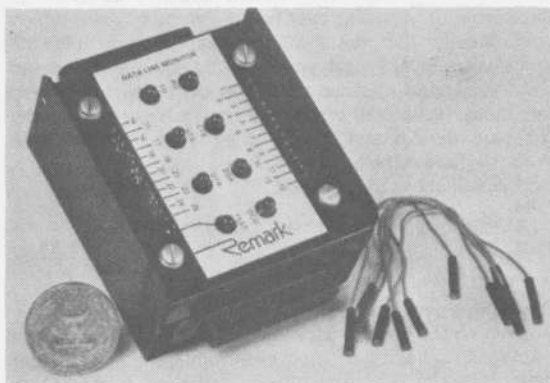
PAYROLL-1 AND MANUAL  
**DTP1** ..... \$ 85.95  
 MANUAL ONLY  
**DTP1M** ..... \$ 9.95  
 PAYROLL-2 AND MANUAL  
**DTP2** ..... \$115.95  
 MANUAL ONLY  
**DTP2M** ..... \$ 9.95

(i.e. by vendor) • MINIMUM QUANTITY SEARCH To provide this information it makes use of the following data fields: ITEM #, CLASS #, VENDOR #, LOCATION, QUANTITY, # SOLD, COST, SELLING PRICE AND DATE. Comes with 40 pages of documentation.

TRS-80 VERSION—LEVEL II/32K-W/2 DISKS & PRINTER  
**T5B103** ..... \$99.95

# TEST EQUIPMENT

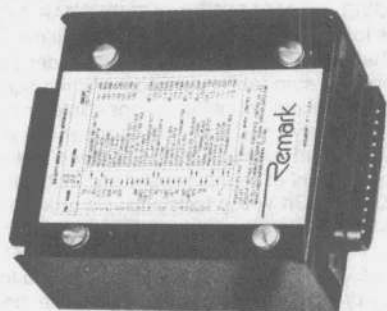
## DATA LINE MONITOR



The Remark Model 40 Data Line Monitor provides fast and inexpensive visual indication of prime data communications signals of an EIA RS232 interface for anyone attempting to isolate modem or terminal problems. Permanent installation for continuous display. No AC or DC power required.

**DLMREM** ..... \$85.95

## DATA LINE ADAPTER



The Data Line Adapter provides a convenient method of altering the polarity of an existing data cable, terminal or modem. Integrity of the 25 electrical paths of the EIA connectors are maintained in a package whose physical size is 3"W x 2.5"L x 1.5"H. Two configurations are offered, the Model 10-1 male-to-male, and the Model 10-2 female-to-female.

MODEL 10-1  
**101DLA** ..... \$21.95  
 MODEL 10-2  
**102DLA** ..... \$22.95

## LINE MONITOR

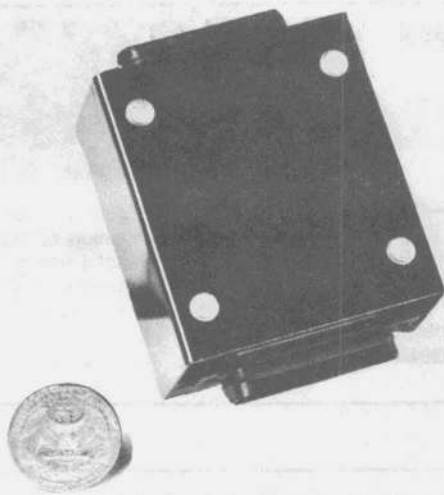


The Line Monitor enables rapid access to the 25 signal paths of an EIA data communications cable. When Line Monitor is placed in series with data cable, the user is presented with 25 test points in the form of industry-standard square pins, all clearly marked and numbered. On the rear of unit is a label that describes the complete RS232 EIA-CCITT Modern Terminal Interface.

The Model 20, in conjunction with a meter, LED probe or scope allows a technician to quickly diagnose any problem with a data network. The Line Module is supplied with two jumpers which allow loopback functions to be implemented anywhere on a EIA RS232C data path. With data communications connectors, the Model 20 is packaged in a rugged aluminum housing 3"W x 2.5"L x 1.5"H.

**201LM** ..... **\$32.95**

## MODEM ELIMINATOR



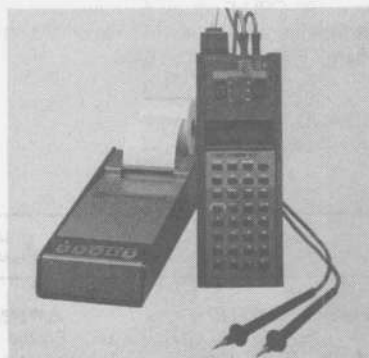
The Modem Eliminator replaces two modems or acoustic couplers when connecting RS232 asynchronous devices over short distances. Applications include terminal-to-terminal, terminal-to-printer or terminal-to-computer. Operation in excess of 750 feet at 1200 baud is allowed.

**30ME** ..... **\$35.95**

## TOOLS

## CALCUMETER™

**3½-digit multimeter with microcomputer control.** At the touch of a button you program the battery-powered Calcumeter to perform complex chores that can save you hours every week: Convert transducer signals automatically to engineering units of temperature, pressure, 20mA current loops, etc. (Mx + b key). • Measure current without breaking into the circuit (Mx + b key),  $I = (1/R)V$ . • Average away noise (AVG key). • Sort components, using the HI-LO LIMITS mode (both "analog" display and audible alarm). • Use the LIMITS mode as a universal logic probe. • Read out audio signals and amplifier gain in dB (dBV key). • Test % tolerance or power supply regulation (% DEV key). • Determine parallel or shunt resistance ( $xy/x \pm$  key;  $xy/x-$  key).

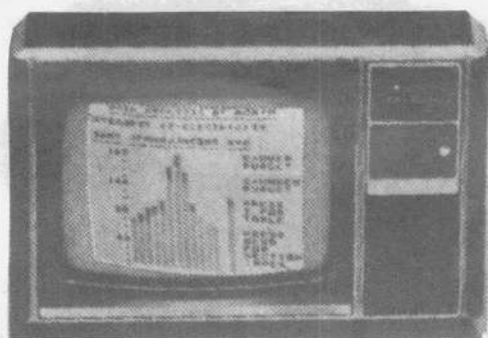
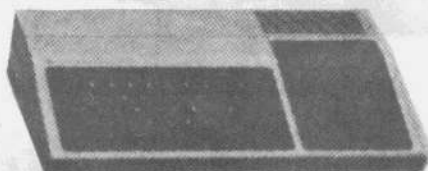


<b>CALCUMETER</b>	
<b>4100</b> .....	<b>\$389.95</b>
<b>SECURITY ENCLOSURE</b>	
<b>4101</b> .....	<b>\$ 55.95</b>
<b>BATTERY ELIMINATOR</b>	
<b>4110</b> .....	<b>\$ 12.95</b>
<b>BANANA PLUG ADAPTOR</b>	
<b>4114</b> .....	<b>\$ 6.95</b>
<b>FOOT SWITCH</b>	
<b>4116</b> .....	<b>\$ 39.95</b>
<b>STANDARD PROBE SET (INCL. RED/BLACK LEADS, ALLIGATOR CLIPS)</b>	
<b>4117</b> .....	<b>\$ 22.95</b>
<b>LEATHERETTE CASE, CALCUMETER</b>	
<b>4118</b> .....	<b>\$ 9.95</b>
<b>LEATHERETTE CASE, PRINTER</b>	
<b>4119</b> .....	<b>\$ 20.95</b>

<b>TEMPERATURE PROBE</b>	
<b>4120</b> .....	<b>\$ 75.95</b>
<b>R.F. PROBE</b>	
<b>4122</b> .....	<b>\$ 75.95</b>
<b>CURRENT SHUNT—20A (AC AND/OR DC)</b>	
<b>4130</b> .....	<b>\$ 45.95</b>
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TI-99/4



**Now—the Texas Instruments TI-99/4 Home Computer** The TI-99/4 gives you an unmatched combination of features, including: Powerful TI-BASIC • Up to 72K total memory capacity. • Outstanding graphic, music and sound capabilities. • 13" color monitor included. • Revolutionary Solid State Speech™ Synthesizer is optional.

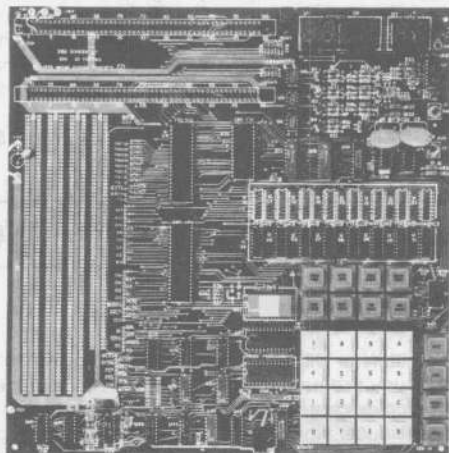
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### Z80 STARTER KIT A COMPLETE MICROCOMPUTER ON ONE BOARD

Z80 Central Processing Unit with 158 instructions • On-Board Keyboard and Display • On-Board PROM Programmer for single voltage PROMs (2716-2758 TI 2516) • Kansas City Standard Audio Cassette Interface • Single-Key Audio Cassette Load and Dump • Expansion Provision for two S-100 Connectors • Wire Wrap Area for Custom Circuitry • Single Step through RAM or PROM • Memory Examine and Change • 4 Channel Hardware Counter/Timer (Z80-CTC) • Two Bi-Directional 8-Bit I/O Ports (Z80-PIO) • Up to 5 Programmable Breakpoints • Switch Selectable PROM or Monitor Restart • Vectors Interrupts Provided by Z80-CTC and Z80-PIO • Single 5 Volt Operation when not Programming • Port Examine and Change • Z80-CPU Register Examine and Change • 2K Bytes ZBUG Monitor in ROM • 1K Bytes of RAM (Expandable to 2K On-Board). FROM SD SYSTEMS

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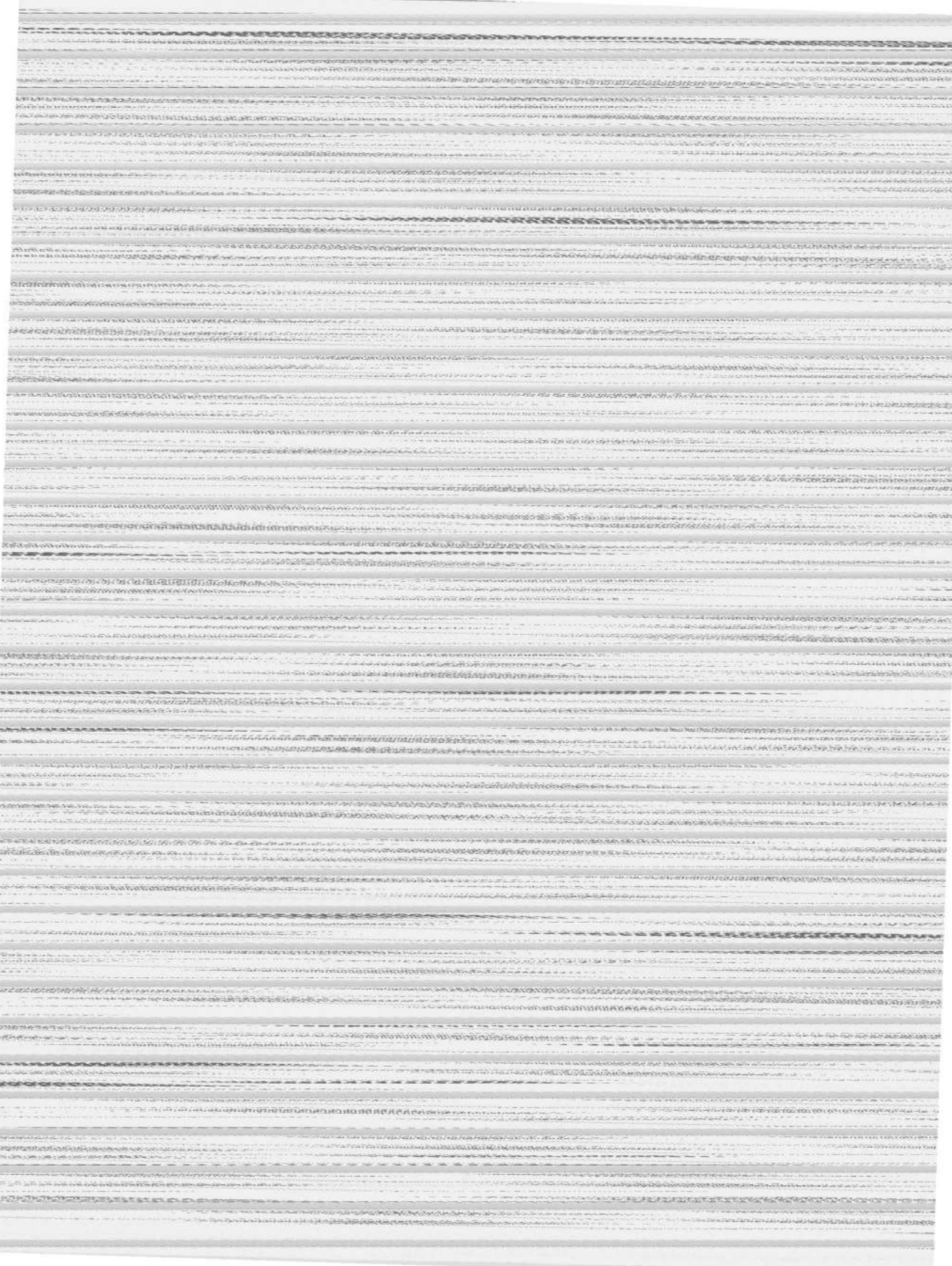
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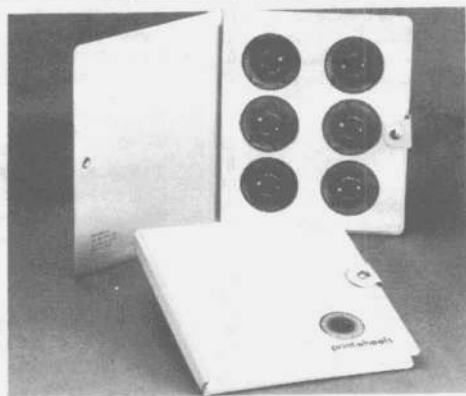


# TYPE ELEMENTS AND PRINT WHEELS



**Type Element Binder**—Protect and store your various IBM ball style type elements. This handy grey French Calf vinyl binder conveniently houses up to 8 type elements for quick access. Binder measures only 6" x 6" x 1¼" and fastens closed with Velco.

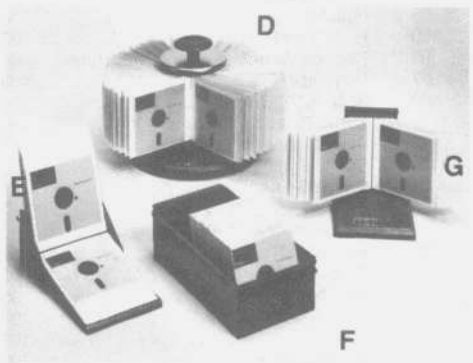
**TB6006** ..... \$ 5.95



**Printwheel Binder**—Snap-closing French Calf vinyl binder protects up to 6 delicate printwheels. This horizon grey binder will accommodate all printwheels on individual raised posts for quick access. Ring King Printwheel Binder measures 11" x 8½" and only ½" thick.

**PW06** ..... \$ 10.95

## MINI DISKETTE STORAGE UNITS



**D. Mini Diskette Rotary File**—Mini sized but maximum utility describes this pint-sized version of the Diskette Rotary File. Same precision steel ball bearing "lazy Susan" action positions up to 150 mini diskettes within 100% plastic sheaths. Clear vinyl allows clear visibility of each diskette when filed.

**E. Mini Diskette Display**—100% plastic sheaths protect mini diskettes and present them at optimum viewing angle. Bronze Plexiglas frame rises from a walnut grained base. Display file comes complete with 15 clear vinyl sheaths to accommodate up to 30 mini diskettes.

**MDD30** ..... \$ 48.95

**F. Mini Diskette Desk Index**—Efficient storage for up to 30 mini diskettes—all available with the flip of a finger. Clear vinyl sheaths store mini diskettes flat and dust free.

**MDI30** ..... \$ 43.95

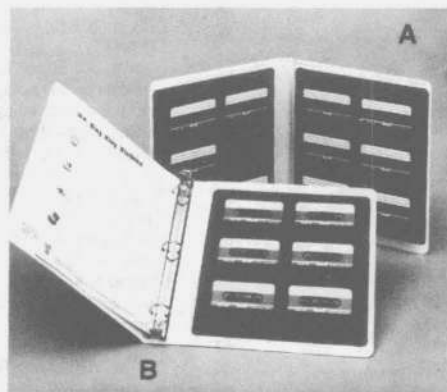
## CASSETTE STORAGE UNITS

**A. Dozen Cassette Binder**—Double-sided, overlapping trays click shut for dust-tight storage. Special cassette retainers check spool movement for increased tape protection. White French Calf vinyl binder folds together for travel, filing or even for mailing.

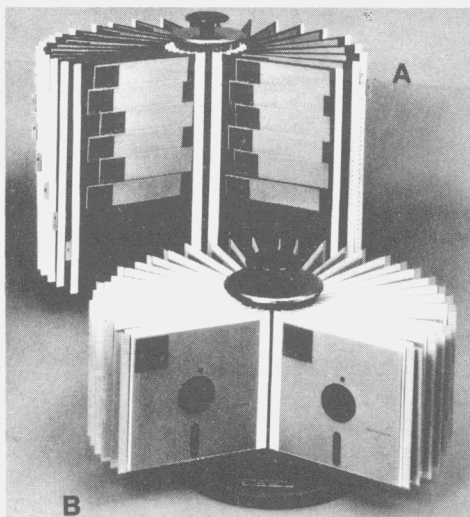
**8511CB12** ..... \$ 9.95

**B. 6 Cassette/Hard Copy Ring Binder**—White French Calf vinyl binder accommodates up to 6 cassettes on one side and will hold hard copy or looseleaf documents with 3 heavy duty ring metals. Spool movement is checked by special retainers.

**8511CB6** ..... \$ 7.95



# DISKETTE STORAGE UNITS

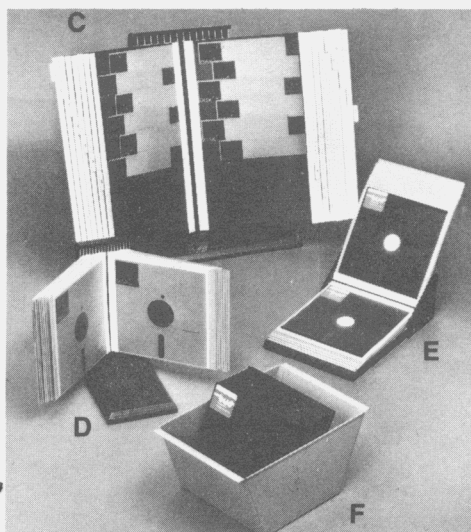


**A. Maxi Rotary Diskette File**—It goes in circles so you don't. Ideal for large files and for use by more than one person, it displays all titles to any direction. Maxi Rotary stands 23" high on a 12" precision ball bearing base. Accommodates 25 Royal Blue Housing Frames (ordered separately) for a total capacity of up to 300 diskettes.

**RKPS501B** ..... \$129.95

**B. Diskette Rotary File**—Little brother to the Maxi Rotary holds 75 non-glare vinyl files—each holding 2 diskettes (ordered separately) for a total capacity of 150. Same precise rotating action on weighted base.

**DR105** ..... \$252.95



**Maxi Desk Stand**—Designed for convenience, beautiful capacity. Angle positioning allows the most comfortable viewing and housing frames open wide for easy retrieval. Constructed of bronze Plexiglas, the desk stand rises from a walnut grained base. Available in sizes to accommodate 15, 30 or 45 Housing Frames (ordered separately) for a total capacity up to 450 diskettes.

**DSPX30M** .....  
**D. Diskette Display**—Little brother to the Maxi Desk Stand comes complete with 15 clear vinyl files to accommodate 30 diskettes. If it's moderate storage capacity and space efficiency you need, choose the Diskette Display file.

**DF30** .....  
**E. Diskette Desk Index**—A flip of the finger presents the diskette you desire. Clever housing for up to 30 diskettes. Low profile allows it to be placed anywhere on desk surface.

**DZ30** .....  
**Disk Tray**—Simple but effective cross tray will accommodate up to 100 diskettes and fits standard hanging files. This sturdy constructed "tub" is designed expressly for diskettes. Angled front and back panels allow flip-through title search. Adjustable stop adapts to smaller volume. Horizon Grey color.

**DT100** .....  
**H. Diskette Housing Frames**—Royal Blue vinyl Housing Frames protect 8 diskettes each. Comes complete with standard removable index tabs and 5 colored inserts.

**FD31108** .....  
**I. Diskette Looseleaf Easel Binder**—Standard black Ring King 3-ring easel binder holds up to 10 Diskette files (ordered separately), for a capacity of up to 20 diskettes.

**85122** .....  
**J. Looseleaf Diskette File**—Durable, non-glare vinyl sleeve holds 2 diskettes each (one per side). Separate top pockets provide printed title inserts (included). Mate with the Ring King Diskette Looseleaf Easel Binder for dust-free storage and maximum versatility.

**FD02** .....  
**K. Porta-Disk**—Vinyl folder opens for disk selection or closes for secure filing. Unit comes complete with 10 non-glare vinyl sleeves to protect 20 diskettes. Folder is made of Gaucho patterned scarlet vinyl.

**DB20** .....  
**85122** .....  
**FD02** .....  
**K. Porta-Disk**—Vinyl folder opens for disk selection or closes for secure filing. Unit comes complete with 10 non-glare vinyl sleeves to protect 20 diskettes. Folder is made of Gaucho patterned scarlet vinyl.

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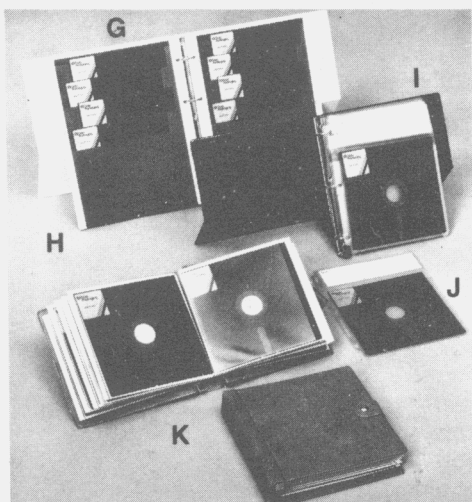
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**85122** .....  
**FD02** .....  
**K. Porta-Disk**—Vinyl folder opens for disk selection or closes for secure filing. Unit comes complete with 10 non-glare vinyl sleeves to protect 20 diskettes. Folder is made of Gaucho patterned scarlet vinyl.

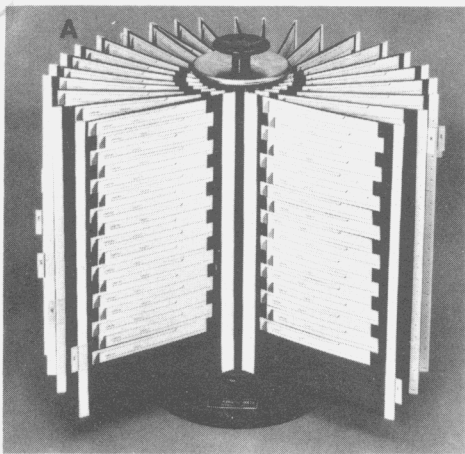


**G. Diskette Easel Binder**—Ideal for small to medium sizes files—providing hands-free diskette viewing. Four-ring, white French Calf Vinyl binder with open/close boosters holds up to 4 Ring King Housing Frames (ordered separately). Each floppy disc has its own assigned location with blank spacing that instantly points out mission files. Open, they're a handy free-standing easel for fast, efficient reference. Closed, they're neat, trim books for convenient, upright shelf filing.

**11142** ..... \$14.95

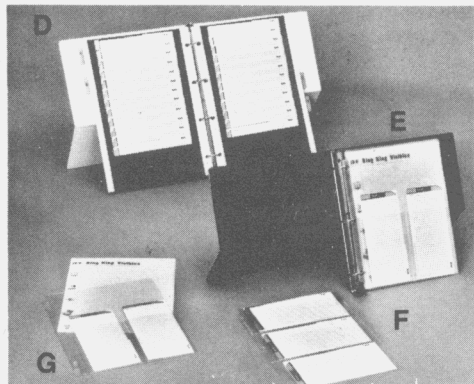
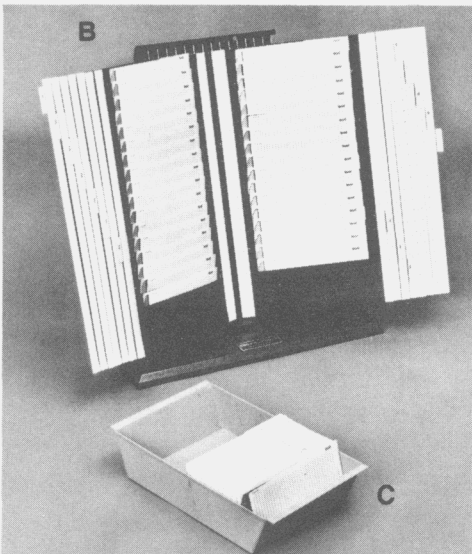


# MAGNETIC CARD STORAGE UNITS



**A. Maxi Rotary Mag Card File**—Capacity for up to 850 magnetic cards providing “lazy Susan” access. Attractive, heavily-weighted stand accommodates up to 25 Ring King Royal Blue Housing Frames (ordered separately). Rigid 100% plastic housing frames provide maximum visibility and chemically neutral protection for magnetic cards.

**RKRS5018** ..... \$129.95



**B. Maxi Mag Card Desk Stand**—Attractive desk top system with enough capacity for the large installation. Available in three sizes, the Ring King Maxi Desk Stand will accommodate up to 45 Royal Blue Housing Frames (ordered separately) for a total capacity of up to an amazing 1530 magnetic cards. Walnut grained base and bronze Plexiglas frame place all titles at a perfect angle for viewing.

**RKDSPX30M** ..... \$84.95

**C. Mag Card Tray**—This Horizon Grey colored steel cross tray accommodates up to 150 magnetic cards. Adjustable back stop keeps even smaller volume files at correct angle for title search.

**MCT150** ..... \$14.95

**D. Mag Card Easel Binder**—White French Calf vinyl binder places magnetic cards at your fingertips. Four-ring metals (with open/close boosters) hold Royal Blue Housing Frames (ordered separately) for a total magnetic card capacity of up to 96. Idea alone for small or medium size files or as a satellite file for much larger system. Can be closed and stored upright on a shelf or flat in a drawer for security. This is an oversized binder created especially for magnetic cards.

**10141** ..... \$14.95

**E. Mag Card Looseleaf Easel Binder**—Rugged Ring King 3-ring easel binder stands open for visible filing or closes for compact storage. The binder comes in four ring sizes: 1", 1½", 2", and 2½" accommodating 5 looseleaf mag card files per ½ inch (ordered separately).

**85111** ..... \$7.95

**G. Mag Card/Hard Copy Looseleaf File**—Easy-access hard copy compartment is open on top and one side and holds up to 20 individual 8½" x 11" documents. Up to 10 magnetic cards (with or without sleeves) are stored right with hard copy in two vertical pockets.

**MC02** ..... \$1.95

# DATA CARTRIDGE STORAGE UNIT

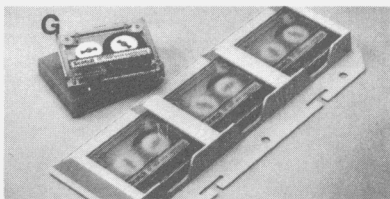
Beige colored files are three hole punched to fit within the Ring King Looseleaf Easel Binder. Cartridges, contained in their boxes, “snap in place” and can be indexed or labeled on title space provided. Units can be ordered single sided holding 3 cartridges or double sided holding six.

**SINGLE SIDED**

**DC03** ..... \$3.95

**DOUBLE SIDED**

**DC06** ..... \$7.95



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