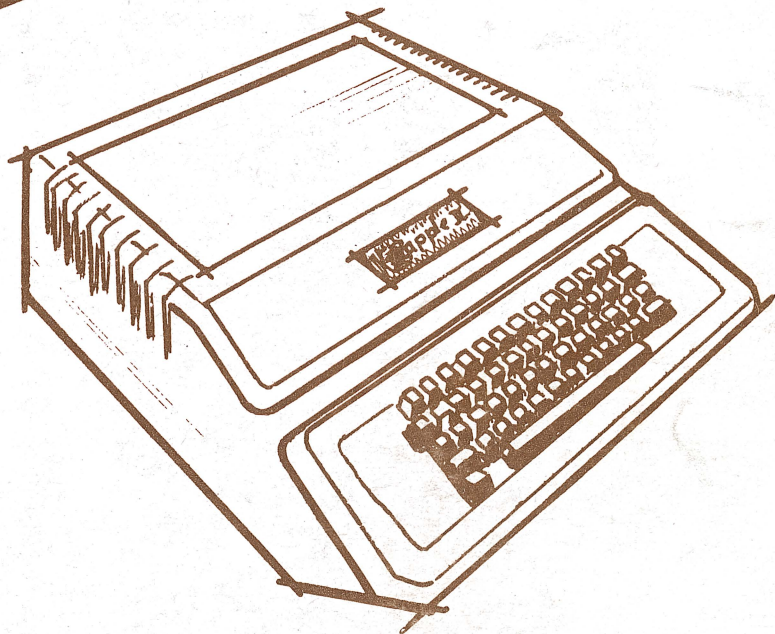# APPLE II™
PERSONAL COMPUTER

RESOURCE DIRECTORY

A "WHERE TO FIND IT" BOOK OF APPLE ACCESSORIES, BOARDS, PERIPHERALS, SUPPLIES & MORE!

INTRODUCTION

The APPLE II home computer is a most unusual product. It has been designed so that you, the owner, can transform it into an infinite variety of personalities to suit your requirements and tastes. Unlike most one-function consumer products, the APPLE II was designed with a modular concept, in which expansion and innovation is encouraged. Eight slots in the motherboard, a game port, and excellent documentation allow the designer or hobbyist to interface the APPLE with dozens of other devices, or to expand its capability. For those who would rather not design, dozens of manufacturers have products in this directory that will enhance or expand your APPLE computer.

This book is written in an attempt to present you with a look at a wide spectrum of products for the APPLE, making your APPLE more useful, more versatile, and more valuable. Welcome to the outside world of the APPLE!

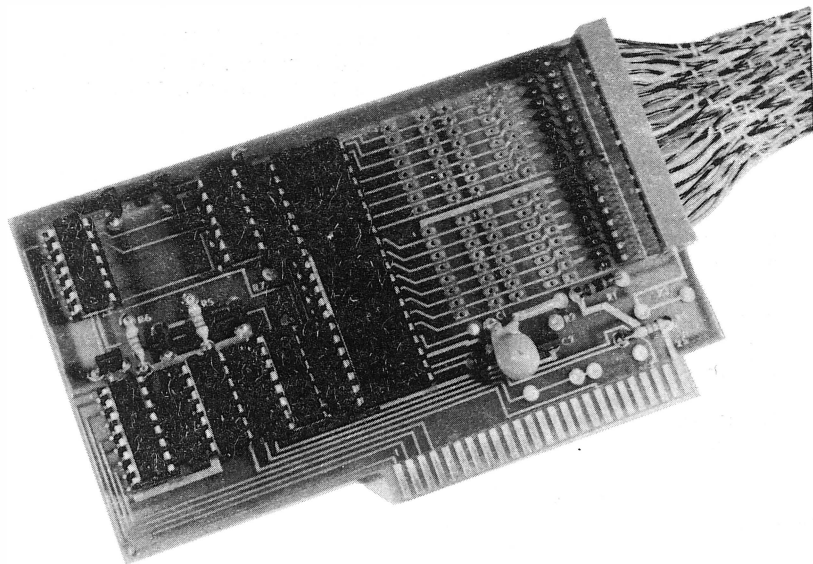## A FEW NOTES OF EXPLANATION

1. **This is not a catalog.** It is a directory of accessories and products for the APPLE II computer, and the contents are for information only.

2. We do not endorse or evaluate the items included in this directory. Omissions are unintentional, and information on new items are welcome. Directory listings are provided at no charge.

3. We recommend that you visit your local dealer or write the manufacturer for further information before purchasing items in this directory. You can then be assured of up-to-date pricing and information. When writing manufacturers, please mention that you saw them in the **Apple Resource Directory.**

4. The information, listings, and prices contained in this directory are believed to be correct at the time of publication, however, WIDL Video assumes no liability whatsoever arising from the use of this information.

5. This directory is written and printed by WIDL Video and is in no way connected with the Apple Computer Company. APPLE II is a trademark of the Apple Computer Company, California.

If you are considering the purchase of a personal computer and have not as yet made your choice, we recommend the APPLE II very highly over every other mini computer currently on the market. The features, quality, and overall value of the APPLE are, in our opinion, outstanding. It has the ability to grow and expand as your needs change because its excellent design was built around modular concepts. The standard APPLE contains eight built-in connectors that allow you to add a variety of languages, printers, floppy disk drives, modems for telephone communication, and many more.

If you are undecided, we feel that the APPLE is an excellent choice. See your local APPLE dealer today for a full demonstration. Feel free to contact us if you have further questions. We will attempt to answer them as best we can without selling you anything, as we do not sell the APPLE. We only believe in the product.

TABLE OF CONTENTS

AI-02 ANALOG INPUT SYSTEM FOR APPLE II

The AI-02 Analog Input Card provides a single card data acquisition system for Apple II computers. Sixteen analog channels may be monitored by the system with 8-bit resolution. Channels are individually addressable and conversion time is 70 microseconds. The system can be operated easily from BASIC, and also provides interrupt capability for more efficient software implementation. The AI-02 is suited to a wide variety of applications including temperature sensing and process control. The AI-02 is the first member of the Applecation (tm) family of accessories for the Apple II. Literature on this product line is available from the manufacturer.

INTERACTIVE STRUCTURES, INC.
Post Office Box 404
Bala Cynwyd, Pennsylvania 19004

AI-02	Analog Input System 16-Channel	$260.00
AI-02-LS	Light Level Sensor	20.00
AI-02-TS	Temperature Sensor	20.00
AI-02-VS	Voice Sensor	25.00
AI-02-KS	Control Knob	20.00
AI-02-SC	Signal Conditioner Card	165.00

AOO3 ANALOG OUTPUT SYSTEM FOR APPLE II

The AOO3 is a latched analog output card for Apple II available in 2-, 4-, and 8-channel configurations. A program written in any language can set the output of a channel with a single operation. The AOO3 accepts an 8-bit quantity (0 to 255) and produces either a 0 to 10 volt output (standard) or a -5 to +5 volt range (jumper selectable). The AOO3 is suited to a wide variety of applications from computer generation of musical tones to control of light or temperature in an industrial process. The AOO3 , together with the AIO2 analog input system, announced earlier this year, represent a complete control and measurement facility for the Apple II, ideal for home sensing and control, laboratory experiment control, or industrial process control.

INTERACTIVE STRUCTURES, INC.
Post Office Box 404
Bala Cynwyd, Pennsylvania 19004

AOO3-2	Analog Output System 2-Channel	$170.00
AOO3-4	Analog Output System 4-Channel	240.00
AOO3-8	Analog Output System 8-Channel	380.00

THE APPLE CLOCK

Until now there hasn't been a Real-Time Clock for the Apple. The Apple Clock from Mountain Hardware keeps time and date in 1mS increments for over one year. On-board battery back-up keeps the clock running in the event of power outage. Software controlled interrupts are generated by the clock. That means you can call up schedules, time events, date printouts . . . all in real time on a programmed schedule.

The Apple Clock is easily accessed from BASIC using routines carried in on-board ROM. With it you can read time and program time-dependent functions for virtually any interval. From milliseconds to days, months, or a year.

Plug the Apple Clock into a peripheral slot on your Apple and you're ready to go.

FEATURES:
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-
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MOUNTAIN HARDWARE, INC.
300 Harvey West Boulevard
Santa Cruz, California 95060
(408) 429-8600

$199.00

RESOURCE 5

PARALLEL TRIAC OUTPUT BOARD

This board has 8 triacs capable of switching 100 volt 6 amp loads (660 watts per channel) or a total of 5280 watts.

Electronic Systems
P. O. Box 21638
San Jose, California 95151

Board only Part No. 210 $ 15.00
With Parts Part No. 210A $119.95

COMMUNICATIONS INTERFACE CARD

The Communications Interface Card extends the usefulness of your APPLE II by allowing it to ''talk'' (through a modem) with other computers and terminals over ordinary telephone lines. What's more, the card lets your system tap the immense resources of timesharing services and the telephone network itself. Now you can load programs over the phone lines; send messages to remote terminals through a timesharing network; or access your office computer from the comfort of your home. And best of all, because this card is intelligent, you can do all these things, quickly and easily, in BASIC. There are no control programs to write or load. Built-in firmware lets the card handle the complete job of serial communications, so you can concentrate on the job you want to do.

- Permits Interactive Programming and Distributed Computing using Two or More APPLE II's
- Quickly Transfers Letters, Programs, or other Information over the Phone Lines Through Standard Modems or Accoustic Couplers
- Allows the APPLE to Become a Terminal for other Computer Systems
- Includes all Necessary Programs — No Software to Write
- Easily Controlled from BASIC using Simple Commands
- Fully Assembled and Tested — No Wiring or Soldering
- Communicated at 110 or 300 Baud, Half- or Full-Duplex
- Provides an RS-232C Serial Interface, with Industry Standard DB-25 Connector
- Works with Bell Telephone Hardware — or Similar Equipment from other Manufacturers
- Plugs into any APPLE II Expansion Slot for Fast Installation
- Uses the APPLE II Power Supply, for Economy and Convenience

The Communication Interface Card allows your APPLE II to exchange data with a remote computer as easily as it talks to its own keyboard and display, using standard BASIC commands. The details of this communication are completely controlled by firmware built into the card, to eliminate the need for user programming.

A simple BASIC command (such as PR#2) initializes the Communications Card to transmit any information that appears on the screen. A second command allows the APPLE II to receive data through the card. Another command allows the system to be controlled by data coming in through the card (instead of by commands from its own keyboard). A fourth transforms your computer into a ''dumb terminal,'' moving data in and out but not operating on it.

There are commands to change the data transfer speed from 300 baud (normal) to 110; to set full- or half-duplex transmission mode; and to provide special handling of lower-case characters.

The Communications Interface Card can be used to adapt a variety of serial equipment (devices that exchange data one bit at a time) to your APPLE II. Hardware that is compatible with this interface includes modems (telephone line adapters) and other equipment that can:

  Transfer serial data at 110 or 300 baud;
  Connect to an RS-232C interface (which defines the voltage levels of the data signals)

Complete operating information, logic diagrams, and firmware listings are supplies in the Communications Interface Card Manual.

PARAMETER	DESCRIPTION
Signal Level:	EIA RS-232C
Data Word Format:	1 start bit, 1 or 2 stop bits, 7 or 8 data bits; odd, even or no parity
Lower Case Characters:	Can be optionally converted to upper-case, or can be passed through unmodified.
Consumption:	5V at 150mA (max.)
Firmware:	256-byte PROM, included on the card
Card Size:	4.5 by 2.75 inches (not including connector finger); fits entirely inside the APPLE II case
External Connector:	DB-25 female connector with mounting bracket

Order Number: A2B0003. Supplied with:
- Communication Interface Card
- Firmware in ROM
- Connector and Mounting Bracket
- Manual
- Demonstration Tape

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95015
(408) 996-1010

APPLESOFT II FLOATING-POINT BASIC LANGUAGE

Applesoft II is an expanded version of Microsoft's popular floating-point BASIC. Its 9-digit arithmetic and large function library make it ideal for business and scientific programs. New features like high-resolution graphics routines, cassette data STORE/RECALL, and user-programmable error messages make the language both powerful and easy to use. Capabilities include:

- 3 Data Types — Real, Integer, and String
- Data Display in either Fixed-Point or Scientific Notation
- N-Dimensional Arrays and N-Letter Variable Names (first two letters significant)
- Extensive Mathematical, Logical and Scientific Capabilities
    - EXP, LN, SQ.RT., SIN, COS, TAN, ARCTAN
    - And, OR, NOT, ABS, INT, RANDOM, SIGN
- String Operatings to Aid the Business Programmer:
    - Compare: =, , =, =,
    - Concatenate: +
    - Variable Type Conversion: ASC, STR, VAL
    - Substring Separation: LEFT, RIGHT, MID, LEN
- Graphics Statements that Simplify Display Programming:
    - Print Format Control: NORMAL, INVERSE, FLASH
    - Graphics Control: COLOR, PLOT, POSN, LINE, DRAW, SCRN, GRAPHICS, TEXT, HIRES, ROT, SCALE, SHAPELOAD
- General Operations that Include and Extend Upon Dartmouth BASIC:
    - Program Manipulation: CLEAR, NEW LIST, RUN, CONT, LOAD, SAVE
    - Variable and Function Definition: DATA, DEF. FUNCT. DIM
    - Data Handling and Storage: READ, RESTORE, STORE, RECALL
    - Loops and Branching: FOR...NEXT, IF...GOTO, IF...THEN, ON...GOTO, ON...GOSUB, ONERRGOTO, RESUME, GOTO, GOSUB, RETURN
    - Input/Output and Format Control: INPUT, PRINT, IN#, PR#, VTAB, TAB, HOME, PADDLE
    - Machine Level Statements: PEEK, POKE, CALL, POP, LOMEM, HIMEM

Applesoft II is supplied as a cassette tape or a plug-in ROM card. The tape version runs in systems with 16K or more of RAM (24K or more for high-resolution graphics). The ROM version will run in 4K or more of RAM, but requires 16K RAM if high-resolution graphics are used. A comprehensive reference manual is included.

(Order Numbers: A2B0009 — card, A2T0004 — tape)

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 996-1010

Z-80 SOFTCARD

A plug-in processor for the Apple II, allows the Apple to run software written for Z-80 based computers. SoftCard includes the CP/M operating system from Digital Research and Microsoft Disk Basic. The user may use either the Apple's 6502 processor as needed to run a program. A command switches between the processors. SoftCard is compatible with existing Apple software and peripherals, according to Microsoft.

Versions of Microsoft's Fortran, Cobol and Basic Compiler for the Apple II with Z-80 SoftCard will be available separately. CP/M applications software written for Z-80 based computers can be converted to run on the Apple with minimal alteration, the supplier claimed.

Among the features that Version 5.0 of Microsoft Basic adds to Applesoft are: PRINT USING for formatted output; long variable names; random disk I/O with variable length records; WHILE/WEND conditional statement; 16-digit precision; and AUTO and RENUM for numbering and renumbering lines. Graphics capabilities are expanded with the graphics statements LINE, PUT and GET.

The Z-80 SoftCard will run on all configurations of the Apple from the standard Apple II to the Apple II Plus with Language Card. No hardware or software modifications are required. It plugs into any of the Apple's slots except slot 0 and does not affect operation of the Apple II when not in Z-80 mode. The Z-80 processor runs at an effective clock rate of 2 Mhz.

SoftCard will run on systems with 48K RAM and single disk drive.

MICROSOFT CONSUMER PRODUCTS   **Card, CP/M and Basic on Diskette and Documentation $349.00**
10800 Northeast Eighth
Suite 507
Bellevue, Washington 98004
(206) 454-1315

INTERFACE BOARD

A newly announced peripheral interface board contains two 2716 PROMs, 20m-A and RS232 interfaces, a real-time clock, and a parallel output port. The board also has two 16-pin DIP sockets, which may be used to connect the board to an external source. Contact the manufacturer for pricing information on the complete board—without components, but with assembly instructions, diagrams, and programs.

PERIPHERAL INTERFACE
173-1128 McKercher Drive
Saskatoon, Saskatchewan
Canada S7H 4Y7
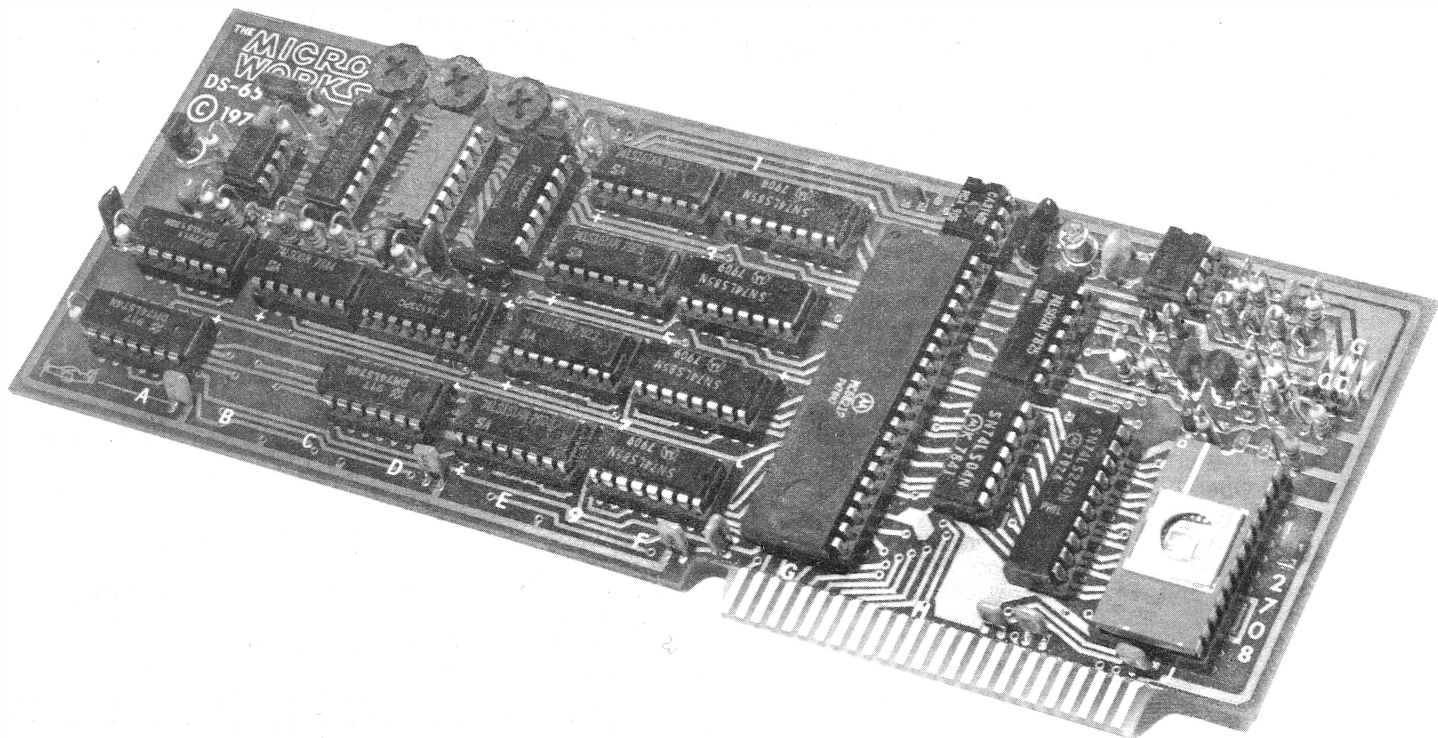
DS-65 DIGISECTOR

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 features:
— High Resolution: 256 x 256 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 Owner's Manual has step-by-step instructions for setup and use, with a complete schematic and explanation of how it functions. Also included is a complete source listing of the on-board software. Basic programs provided include a smart burglar alarm and a graph reader.

Operation is simple; the computer sends the Digisector two eight bit addresses (X and Y coordinates), and the Digisector returns the digitized brightness of the image at the specified location. For setup and monitoring purposes, the Digisector produces an output comprised of the camera's video signal plus a superimposed cursor, showing exactly where the DS-65 is looking.

You can use the DS-65 for digitizing pictures for display by programs; security systems; moving target indicators; computer portraiture; fast to slow scan conversion for ham operators; reading paper tape, strip charts, bar codes . . . just about anything!

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!

The MICRO WORKS	**DS-65 Price:** $349.95
P. O. Box 1110	**Advanced Video FSII Camera Price:** $299.00
Del Mar, California 92014	**COMBINATION PRICE:** $599.00
(714) 942-2400	

PARALLEL PRINTER INTERFACE CARD

The Parallel Printer Interface Card opens up a whole range of printing applications for your APPLE II. With this card (and almost any popular printer), you can produce the reports, diagrams, labels and listings your application requires. And, because this interface is intelligent, it's easy to use—no complex control programs for you to write or load. The card's built-in brainpower does the work for you; while you concentrate on the job you want to do.

We designed this card to handle the **whole** task of printer control; so that your programs can use all the capabilities built into your printer. Expanded headlines, lower-case text, graphics—if the printer can do it, you can now program it simply and quickly, in BASIC. By building in the firmware that makes this card intelligent, we set a new performance standard for personal computer interfaces.

- No Programming Needed — All Required Software in On-Board ROM
- Allows Printing Through Simple BASIC Commands
- Allows Up to 255 Char/Line — Upper and Lower Case, Special Symbols, etc.
- Handles Printers Up to 500 Char/Sec (3700 LPM at 80 Char/Line)
- Fully Assembled — Not a Kit
- Interfaces to Most Popular Printers (Axiom, Centronics, SWTP, etc.) Through an 8-bit Parallel Port
- Easy Installation — Simply Plugs into a Connector in the APPLE II

The intelligent Printer Interface Card allows your BASIC program to produce hard-copy output as easily as it '' prints'' on the TV monitor screen. Command interpretation and printer control details are handled by the firmware built into the card, to eliminate user programming requirements.

A simple BASIC command, such as PR#1, initializes the Printer Card. Subsequent PRINT statements will send data to the printer as well as the TV monitor at 40 characters/line. (The card does not normally have to be initialized again unless the APPLE II is turned OFF or RESET.)

A second command disables the TV monitor and sets the printer line width between 0 and 255 characters/line. Another command returns output to both the TV and printer, at 40 characters/line.

For special applications, there are commands to change the printer control character, and to disable the automatic printer card line feed (to allow use with printers that generate their own line feeds).

And finally, the command PR#0 turns the printer card OFF entirely.

The Parallel Printer Interface Card has been tested with Axiom, Centronics, Printronix, and SWTP printers. However, it is designed to work with almost any printer that can:

- Take in data through a 7- or 8-bit parallel port;
- Accept data when a STROBE signal (supplied by the APPLE II) tells the printer that the data is ready; and
- Return an ACKNOWLEDGE signal to the Printer Interface Card when it has taken the data in for printing.

Complete information on adapting the Printer Interface Card to various printers is supplied in the Parallel Printer Interface Card Manual.

PARAMETER	DESCRIPTION
Data and Control Outputs:	Bits 0-7 and STROBE (Positive-going or negative-going acceptable)
HIGH-LEVEL OUTPUT:	2.7V (min. 0.4mA (max.
LOW-LEVEL OUTPUT:	0.5V (max.), 8.0mA (max.)
Control Input:	ACKNOWLEDGE (Positive-going or negative-going acceptable)
HIGH-LEVEL INPUT:	2.0V (min.), 20uA (max.)
LOW-LEVEL INPUT:	0.8V (max.), -0.4mA (max.)
Power Consumption:	5.0V at 150mA (max.)
Firmware Storage:	6309 (256x8) PROM, on card
Printer Control Characteristics	
LINE WIDTH:	Up to 255 characters/line
OUTPUT SPEED:	Up to 5000 characters/second, controlled by the printer
Card Size:	4.5'' x 2.75'' (not including connector fingers): fits inside the APPLE II
Printer Connection:	By means of 20-wire ribbon cable, included (user must supply connector on printer side of cable.)

Order Number: A2B0002. Supplied with:
- Parallel Printer Interface Card
- Firmware in ROM
- Configuration Jumper Block
- Ribbon Cable
- Manual

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 996-1010

REAL TIME CLOCK
SYSTEM DESIGN ENGINEERING
25131½ Cypress
Lomita, California 90713
(213) 970-1245
(213) 530-9891

A10 SERIAL AND PARALLEL APPLE INTERFACE
TWO BOARDS IN ONE

The A10 Apple Interface allows maximum flexibility for interfacing your Apple II with peripherals such as printers, plotters, terminals, modems and other computers. The A10 can communicate with both serial and parallel devices. It can even interface with both at the same time. And you won't need to write any software to operate the A10. It comes complete with the necessary software and on-board firmware to handle serial and parallel communications.

Today you may need just a serial interface or a parallel interface. But what about tomorrow? Why limit yourself when you can get two boards in one with SSM's A10 Serial and Parallel Apple Interface.

FEATURES
- One RS-232 serial interface with:
  — Three handshaking lines (RTS, CTS, DCD)
  — Nine standard baud rates from 110 to 19,200 baud including 134.5 baud for selectrics.
  — Additional baud rates possible through external input.
  — Baud rates rotary switch selectable—no jumpers required.
  — Modes of serial communication software controlled.
- Two bi-directional 8-bit parallel ports with:
  — Four additional interrupt and handshaking lines.
  — Interface configuration software controlled.
- Includes on-board firmware for controlling serial interface and software for driving parallel printers. Firmware for parallel interface control available as an option.
- Cable assemblies for serial and parallel interfaces included.
- Comprehensive users manual with easy to follow application notes for interfacing to most popular printers and terminals.
- Plugs into any Apple II expansion slot.
- Available assembled and tested or in kit form.
- Warranty: Assembled—one year, Kit—90 days.

SERIAL INTERFACE

The A10's serial interface uses the RS-232 standard to assure maximum compatibility with a variety of serial devices. For example, with the A10 you can connect your Apple to a serial printer for hard copy of programs or other information. The A10 can also interface with a serial CRT terminal to expand the Apple's video display beyond 40 characters per line. By interfacing with a modem you can utilize time sharing services or communicate with a remote computer over telephone lines.

On-board firmware provides the capability to:
- Generate automatic line feed
- Turn off the Apple's video display
- Vary line length
- Generate a delay on carriage return
- Operate the board from any Apple II expansion slot

PARALLEL INTERFACE

With A10's parallel interface you can connect your Apple to a variety of parallel printers. There are enough lines to handle two printers simultaneously with handshaking control. The users manual includes a software listing for controlling parallel printers or, if you prefer, a parallel driver routine is available in firmware as an added option.

The parallel interface can also be used as a general purpose interface for a variety of control applications such as security systems, environmental control or automated sprinklers. Your imagination is the only limitation.

SPECIFICATIONS

Serial Interface
- One RC-232 interface with EIA receivers and drivers
- Available handshaking lines—Request-To-Send (RTS), Clear-To-Send (CTS), Data-Carrier-Detect (DCD)
- Rotary switch selectable baud rates—110, 134.5, 300, 600, 1200, 2400, 4800 (9600 and 19200 baud available under software control for printers)
- External clock input for up to 500K baud
- Software controlled modes:
  — 7 or 8 data bits
  — Even or odd parity
  — 1 or 2 stop bits
  — $\div 1$, $\div 16$, $\div 24$ baud rate divisor
  — Master reset
  — RTS mode control
- Double buffered send and receive registers
- Supports full duplex operation

Parallel Interface
- Two bidirectional 8-bit ports
- Four additional interrupt and handshaking lines
- Interface configuration and data direction controlled by software

Firmware
- 256 bytes of on-board PROM

Addressing
- 6 memory mapped registers

Cable Assemblies
- Serial interface—6 inch ribbon cable with DB-25 socket
- Parallel interface—18 inch ribbon cable with uncommitted end

PC Board
- High grade FR-4 blue epoxy

- Double sided solder mask with silk screened parts legend and gold-plated edge connector contacts
- Dimensions—2.7'' x 6.3'' (excluding edge connector contracts)

Miscellaneous
- PROMs and data buffer power-down when not addressed
- Sockets provided for all ICs

SSM
2116 Walsh Avenue
Santa Clara, California 95050
(408) 246-2707

HOBBY/PROTOTYPING CARD

The Hobby/Prototyping Card provides the user with a means of building up experimental circuitry for the Apple computer. This 2¾'' x 7'', double-sided circuit board includes a hole pattern (on 100-mil centers) that accepts all conventional integrated circuits and passive components. The card plugs directly into one of eight sockets on the Apple circuit board, and fits entirely within the APPLE II case. Documentation includes a complete system bus description to aid the interface designer.

(Order No. A2B0001)

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 995-1010

DOUBLEVISION 80 COLUMN BOARD
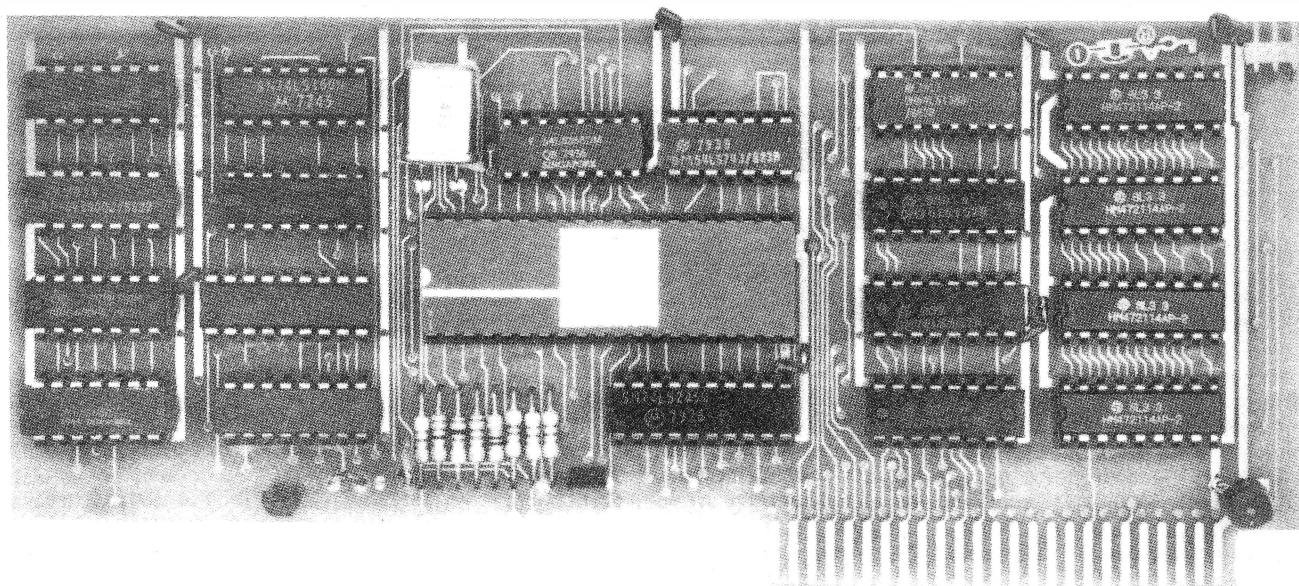
Eighty columns x 24 lines video display with upper and lower case. Works with Apple II, Apple II Plus and PASCAL. Full 96 ASCII character set. Fully programmable cursor: 1-9 lines any position, blinking (2 speeds) and non-blinking. All software included for BASIC (optional for PASCAL). Compatible with the latest in word processing software ''Apple-Pie 2.0.'' Shift lock feature. Built in light pen capability. Inverse video. Full cursor control. 50/60 Hz operation. No conflict with other boards.

THE COMPUTER STOP $295.00
16919 Hawthorne Boulevard   PASCAL software interface additional $25.00
Lawndale, California 90260
(213) 371-4010

APPLE II I/O BOARD KIT

Plugs into Slot of Mother Board • One 8 Bit Parallel Output Port (Expands to Three Ports) • One Input Port • 15mA Output Current Sink or Source • Can Be Used for Peripheral Equipment Such as Printers, Floppy Discs, Cassettes, Paper Tapes, etc. • One Free Software Listing for SWTP PR40 or IBM Selectric.

ELECTRONICS WAREHOUSE INC.   1 Input and 1 Output Port $49.00
15820 Hawthorne Boulevard   1 Input and 3 Output Ports $64.00
Lawndale, California 90260
(213) 370-5551

HIGH-SPEED SERIAL INTERFACE CARD

The High-Speed Serial Interface Card allows APPLE II to exchange data with computers, printers and other fast devices in serial format (one bit at a time). In the printer mode, it can produce charts, reports and labels on most popular printers. As a communications controller, it is ideal for situations in which large programs or blocks of data must be transferred. It is intended for use (in place of the Communications Interface Card) in applications that:

- Involve serial printers or terminals;
- Use data rates other than 110 or 300 baud (10 or 30 char/sec); or
- Require movement of large data blocks (256 or more bytes) without interruption

The Serial Card features on-board firmware that provides BASIC control in both block-data-transfer and printer-operation modes. A number of hardware and software switches on the card serve to adapt it to a wide variety of applications, yet it remains simple to use because of its built-in intelligence.

- Permits BASIC Control of High-Speed Printers and Plotters
- Quickly Transfers Large Blocks of Data by Telephone (through a modem), or Directly to Local Equipment
- Allows the APPLE II to Communicate with High-Speed Terminals and Other Computers
- Includes Control Software in ROM — No Programs to Write
- Handles Half-Duplex Communication from 75-19.2K Baud
- Provides Switch-Selectable Preset Conditions for Speed, Line Length, Auto Line Feed and Carriage Return Delay
- Fully Assembled and Tested — No Wiring Required
- Provides an RS-232C or Current Loop Serial Interface, with Industry Standard DB-25 Connector
- Works with Bell Telephone Hardware, or Similar Equipment from Other Manufacturers
- Plugs into Any APPLE II Expansion Slot for Fast Installation
- Uses the APPLE II Power Supply for Economy and Convenience

The Serial Interface Card allows your APPLE II to exchange data with a remote computer or other high-speed device as easily as it talks to its own keyboard and display. You simply specify the area of memory whose contents are to be moved and the direction of movement (in or out). The rest of the job is handled by built-in firmware on the Serial Card.

A simple BASIC command (such as PR#1) initializes the Serial Card. A second command may then be used to specify any changes in speed, parity, etc., from the switch-selected preset conditions. Then, in the block transfer mode, a single statement will cause an entire data block to be transferred in or out of the APPLE II.

In the printer mode, information is automatically transmitted out through the card. Special provision is made for handling lower-case characters, carriage return delays, and printer line widths of up to 255 characters. BASIC listings are formatted.

The Serial Interface Card can adapt a variety of serial equipment to your APPLE II. Hardware that is compatible with this interface includes modems (telephone line adapters), printers, plotters, computers, and other equipment that can:

- Transfer Serial Data at 75-19, 200 Baud, Half-Duplex
- Connect   to an RS-232C Interface (which defines voltage levels and the connector type)

Complete operating information, logic diagrams and firmware listings are supplies in the Serial Interface Card Manual.

PARAMETER	DESCRIPTION
Signal Level:	EIA RS-232C
Data Word Format:	1 start bit, 1 or 2 stop bits, 5-8 data bits; odd, even, or no parity; Checksum is optional
Character Handling Options:	Lower-case characters can be optionally converted to upper-case or can be passed through unmodified and displayed in inverse video on the monitor screen.
Firmware:	768 bytes of PROM, included on card
Card Size:	4.5 x 2.75 inches (not including connector fingers); fits entirely inside the APPLE II case
External Connector:	DB-25 female connector with mounting bracket

Order Number: A2B0005. Supplied with:
- High-Speed Serial Interface Card
- Firmware in ROM
- Connector and Mounting Bracket
- Manual

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 996-1010

APPLE BUTLER

A new foreground/background system for home control called Apple Butler gives the Apple II the capability of running two programs concurrently; one for the monitor and control of systems in your home, and one for any other task you care to do.

The Butler provides up to 16 analog inputs for temperature, light, moisture, or any other input data. Up to 32 switch inputs are provided for security or fire sensors, push buttons, magnetic reed switches, or other on/off inputs or status indicators from controlled devices. Up to 32 output latches are available for control of output devices.

Several control modules will be available for the Apple Butler system. The first will be a solar heating control system to control a solar hot water heater, a solar assisted home heating system, a water-heating fireplace heating system, or a combination of the three. Other systems are planned for control of automatic swimming pool equipment, sprinkler systems, home or commercial greenhouses.

HOME COMPUTER CENTER $595.00
2927 Virginia Beach Boulevard
Virginia Beach, Virginia 23452
(804) 340-1977

GENERAL PURPOSE IO BOARD
- 2 8 bit programmable IO ports
- 1 timer/square wave generator
- 1 timer/counter
- 1 shift register
- 2 10 cables   50 pages instructions
- Large area for user buffers, relays, etc.
- Board uses 6522 VIA   See MICRO, 13:41, 15:17, 17:27, 1979

MICRO AUSTIN $69.50
Post Office Box 14408   Order AP 1.0
Austin, Texas 78761

SUP'R'TERMINAL 80 COLUMN BOARD
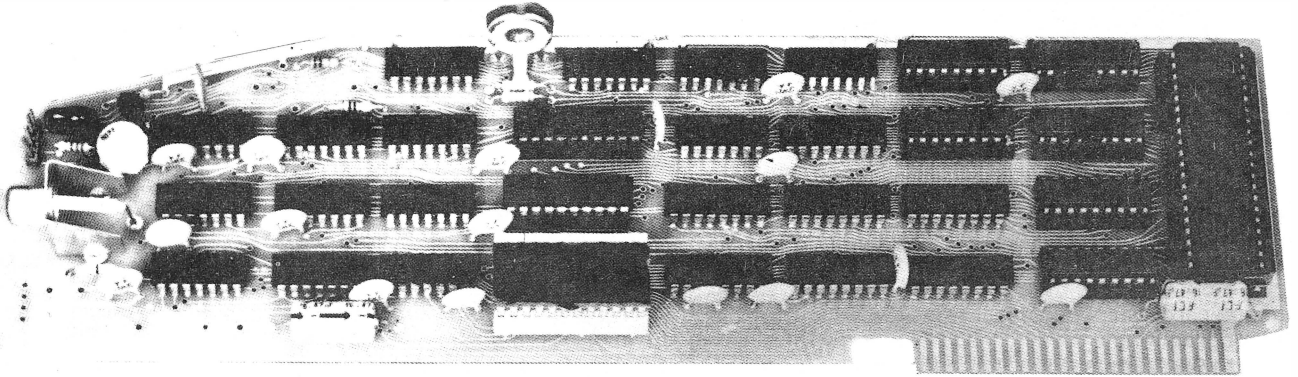
SUP'R'TERMINAL is an 80 column by 24 line plug-in compatible board for the Apple II computer. Eighty columns by 24 lines, upper and lower case; all 128 ASCII characters. Upper and lower case entry using the Apple II keyboard. Includes an upper and lower case 5x8 dot matrix ASCII character set, and inverse alpha characters. Character set can be user definable. Includes VBCtm (video balance circuit) which enables the use of displaying 80 columns on an inexpensive 8 MHz CRT monitor. Shift lock feature. Works with APPLE PASCAL and APPLE BASIC. Incorporates PASCAL and BASIC control characters. ALL monitor-type escapes are valid. Follows protocols of PASCAL and BASIC operating systems. Compatible with ALL APPLE II peripherals. Effective baud rate greater than 10,000; fast scrolling and clearing. Synchronous operation with APPLE II. Can be used with APPLE II communication interface board to act as self contained terminal for time-sharing or other applications.

M&R ENTERPRISES
Post Office Box 61011
Sunnyvale, California 94088

FAST FLOATING POINT BOARD
The AMD9511 Fast Floating Point Processor Board increases the computation speed of the Apple II such that the calculation of 5000 sines requires only about 24 seconds rather than 133 seconds. The table below shows the speed increases for various math functions:

FUNCTION	AMD9511 BOARD	APPLESOFT II
X = SGN(I)	14 seconds	14 seconds
X = SQR(I)	15 seconds	250 seconds
X = SIN(I)	24 seconds	133 seconds
X = COS(I)	24 seconds	135 seconds
X = TAN(I)	27 seconds	246 seconds
X = ATN(I)	27 seconds	224 seconds
X = LOG(I)	25 seconds	114 seconds

COMPUTER STATION   **Fully assembled and tested $450.00**
3659 Nameoki Road
Granite City, Illinois 62040
(618) 452-1860
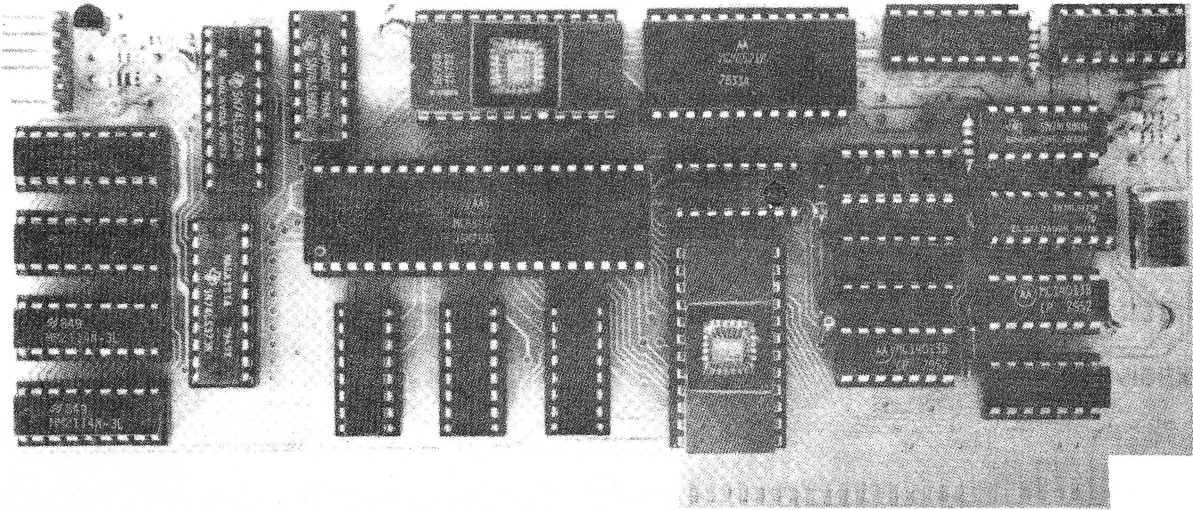
VIDEOTERM is an 80 column by 24 line 7 x 9 matrix. Plug in compatible board for the APPLE II. Eighty columns by 24 lines, with easy to read 7 x 9 dot matrix, upper and lower case with descenders. 1K firmware that incorporates PASCAL and BASIC protocalls, user isn't required to enter machine language programs or change PASCALS, MISC. INFO., or GOTOXY files. Upper and lower case data entry with shift lock, using the APPLE II keyboard. VIDEOTERM is the same size as the APPLE language card. Display control character mode, where any control characters embedded in character stream are displayed. Fully programmable cursor, 1-9 lines along with blinking at two rates or non-blinking. Font size is programmable in the range of 8 x 2 to 9 x 16 dots. Four standard display formats that are controlled by escape sequences. Compatible with all APPLE II peripherals. Fifty or 60 HZ operation. Power and input connector for light pen. Sockets for all integrated circuits. Crystal controlled dot clock for excellent character stability. Power consumption is held to a minimum through the use of CMOS and lower power devices. Limited graphics or character set can be user definable up to a maximum of 128 symbols of 8 x 16 dot matrix font. Eighth bit of ASCII code can be used to change any character to inverse display mode. Black on white or white on black video output.

VIDEX
3036 Northwest Thistle Place
Corvallis, Oregon 97330
(503) 758-0521

Without Graphics EPROM	**$345.00**
Graphics EPROM	**25.00**
VIDEO SWITCH PLATE	**12.00**
Manual	**15.00**

SOFTOUCH TONE DIALER

Consists of an interface card for the Apple, a Tone Module, and versatile disk software package to maintain and sort a file of addresses and phone numbers. The Softouch Tone Dialer is directed towards Apple users in business or home, to take practical advantage of computer power for routine everyday activities.

SCIENTIFIC MICRO PROGRAMS   **$89.00**
1196 East Cunningham Drive
Palatine, Illinois 60067

APPLETIMEtm, A REAL TIME CLOCK

The Appletime (Model APT-1) is a single peripheral board which plugs directly into any 1/0 slot on the Apple II. Timing is done completely in hardware (i.e. NOT an interrupt driver clock). Thus, the Appletime continues to operate even when the computer is turned off. Our exclusive Three Way Power System keeps the clock running via its own AC supply, the computer's, or battery backup in case of power failure. Other features include 12/24 hour selection, AC or crystal timebase, 50/60 Hz, and BCD or ASCII data format. Fully assembled and tested, with instructions.

WEST SIDE ELECTRONICS   **$79.95**
P. O. Box 636
Chatsworth, California 91311

PROTO-BOARD FOR APPLE II

Over 1300 holes on 0.1 inch centers for designing your own circuits.

WEST SIDE ELECTRONICS   **APB-1 Prototyping Board $16.95**
P. O. Box 636
Chatsworth, California 91311
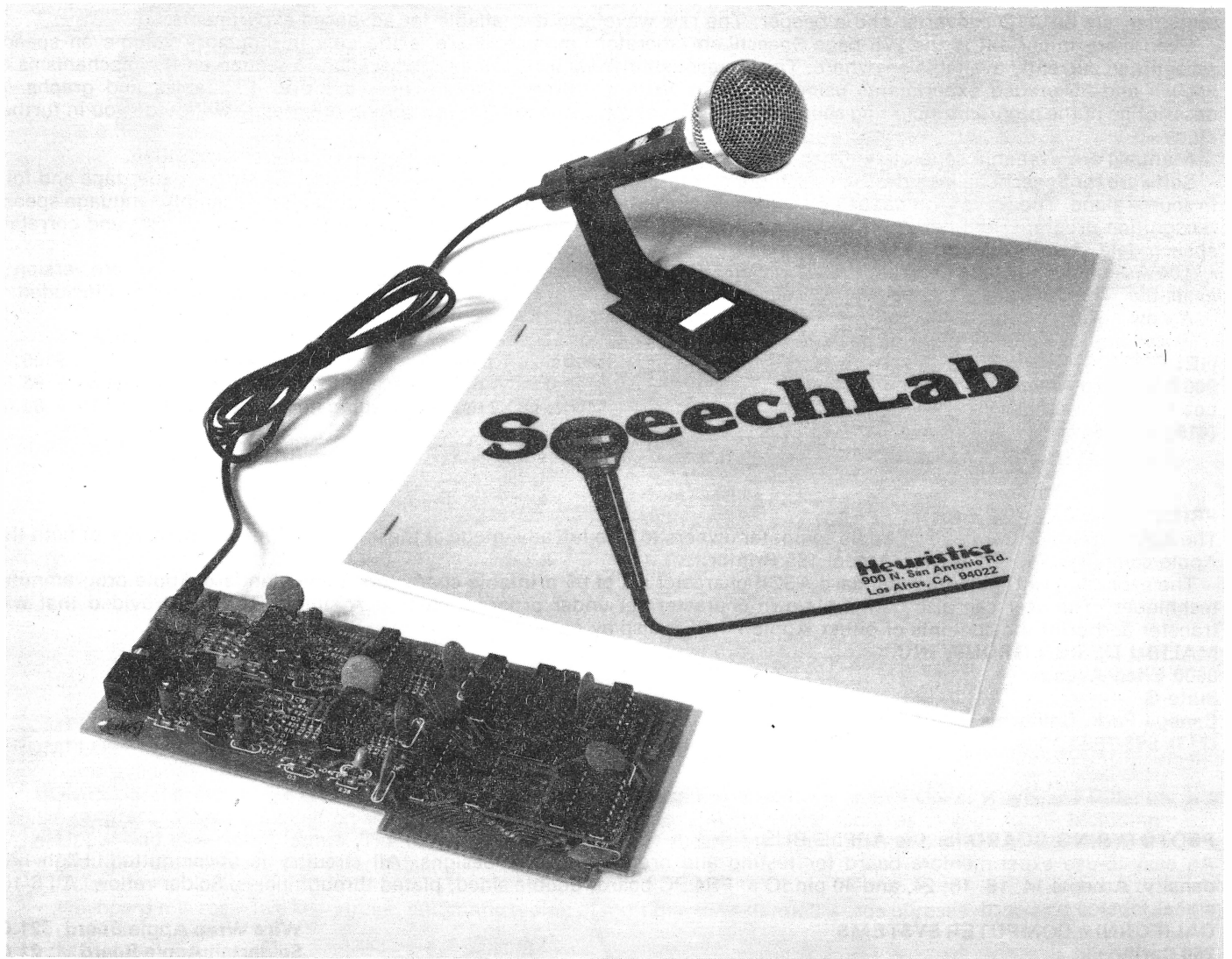
SPEECHLAB

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

Speech entry is natural in any language. Speech is the most convenient communications channel for all of us. Two or three hours of training will make you an expert in voice computer entry.

Speech is a human's highest capacity output channel. You can use it in the dark, around corners and without contact. You can use it in conjunction with other data entry for high throughput.

You can use speech on the move. It's compatible with telephones and voice communication networks. Speech is unaffected by weightlessness. Use it in a clear room environment.

Use it anywhere lightweight, completely portable computer entry is required.

Typical applications for SpeechLab include voice control games, package sorting, inventory entry, air traffic control, data retrieval, data entry, cartography, computer aided troubleshooting, airline reservations, programming and speech recognition research.

Features include ROM based software with a relocatable program so you can load it anywhere you have memory. After loading, the 2K ROM can be disabled under computer control. The speech recognition program, callable from any BASIC, requires 4K bytes of user supplied RAM. This RAM can be located anywhere in the address space. 32 word vocabulary.

Hardware includes two band pass filters with two bits of amplitude, two zero crossing detectors and a linear amplifier.

A combined hardware/software manual includes ten experiments.

SpeechLab features functional signal processing modules that can be reconfigured under software control for maximum freedom. Filter skirt roll-off is 80 dB per decade. SpeechLab carries an on-board signal generator, for prompting and built-in test, previously found only in the most expensive equipment. Typical power consumption is 1 watt. For ease of use there is a single on-board input/output port.

Hardware includes three band pass filters (6 bits amplitude), one zero crossing detector, a linear amplifier, compression amplifier, six bit A/D converter and a beeper. The raw waveform is available for advanced experiments.

Even more important is the 275 page SpeechLab laboratory manual. Here is the only introductory volume on speech recognition currently available anywhere. The SpeechLab manual includes an introduction, a section on the mechanisms of speech and 35 graded experiments using programs written in SpeechBasic. There are over 100 tables and graphs. A description of the programs including source code is part of the package. A seven page bibliography will guide you in further study.

Manuals are available separately. They are excellent introductory texts on speech and pattern recognition.

Software for SpeechLab includes seven complete programs, three of which are offered in source and on paper tape and four in source alone. The three with paper tape and source are: SpeechBasic programming language; Assembly language speech recognition program; and hardware self test program. Source programs are provided in SpeechBasic to plot and correlate speech data. Two recognition programs are offered to clarify speech concepts.

The Assembly language program uses less than 4K bytes for a 32 word vocabulary. It loads at 100H. A high core version is available. The SpeechBasic BASIC interpreter loads at 0 and requires 8K of memory. A diagnostic program is included.

A new noise cancelling microphone is offered for the Model 20.

Prices do not include freight or postage. All orders prepaid or C.O.D. Prices subject to change without notice.

HEURISTICS, INC.
900 North San Antonio Road
Los Altos, California 94022
(415) 948-2542

Model 20A [Apple] assembled and tested	**$189.00**
Model NC-1 noise cancelling microphone for Model 50	**$ 85.00**
Model NC-2 noise cancelling microphone for Model 20	**$ 85.00**

PRINTER INTERFACE CARD

The Apple Interface Card allows Apple computer owners to take full advantage of the unique graphics capabilities of both the Apple computer and the Malibu Model 165 Printer.

The user can print the entire standard ASCII character set of 96 printable characters using standard Apple programming techniques. The user can also define his own character set under program control. A simple CALL is provided that will transfer and print the contents of either Apple HI-RES display page.

MALIBU DESIGN GROUP, INC.
8900 Elton Avenue
Suite G
Canoga Park, California 91304
(213) 998-7694

PROTOTYPING BOARD for the APPLE BUS

An easy-to-use experimentors board for testing and prototyping new designs. All circuitry is uncommitted. High hole density. Accepts 14, 16, 18, 24, and 40 pin IC's. FR4 PC board, double sided, plated through holes. Solder reflow. All S-100 signal labeled on-board.

CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811

Wire Wrap Apple Board	**$21.00**
Soldertail Apple Board	**21.00**
Blank Apple Board	**21.00**
(unetched, undrilled)	

HEURISTICS SPEECHLINK tm 2000

Talk To Your Computer . . .
- Voice data entry to the Apple computer
- Voice control of your Apple system
- User variable vocabulary (64 words and up)
- Applesoft and Integer Basic compatible with or without disk operating system

Useful For . . .
- Collecting inventory data
- Running the Apple as a terminal
- Controlling production test equipment (say "test 2")
- Menu selection of programs (say "stocks")
- Entering stock market data
- Educational programs for the kids (say "square")

HEURISTICS, INC.
900 North San Antonio Road
Los Altos, California 94022
(415) 948-2542

Model 2000	**$259.00**
Model 20A	**$189.00**
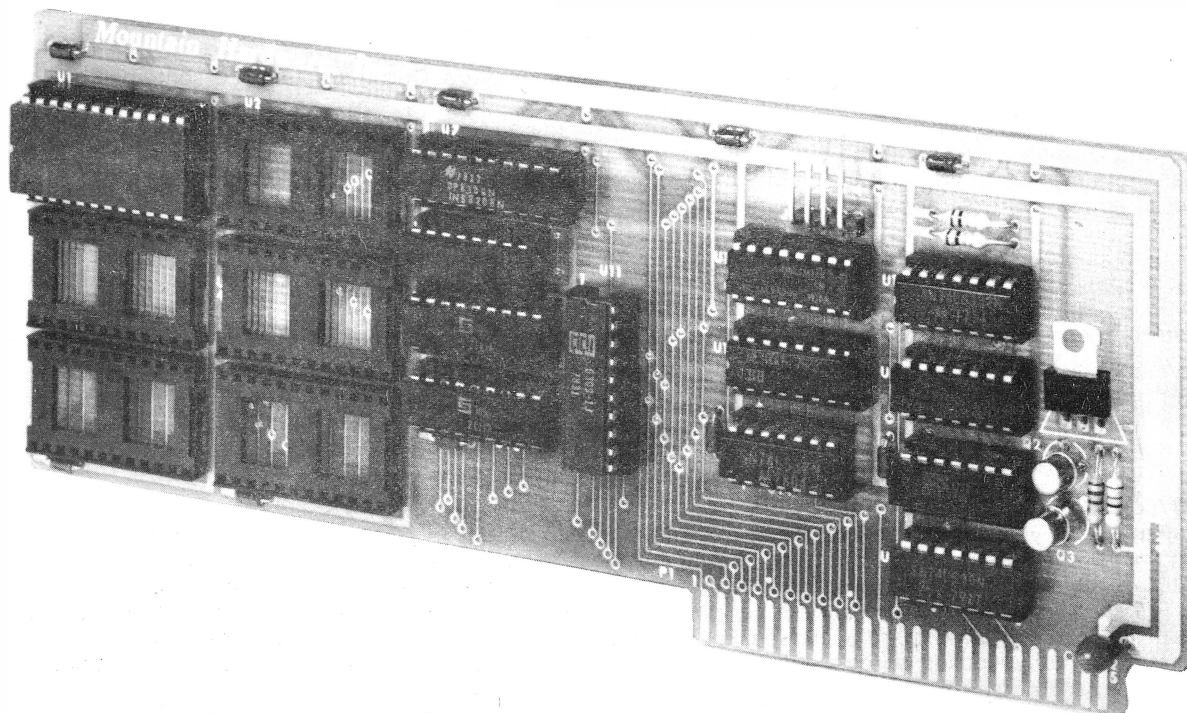
ROMPLUS +

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

ROMPLUS+ provides six sockets to accept individually addressable 2K ROM's or EPRON's. Keyboard Filter tm, 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 macros—two key-stroke, automatic typing of multiple, user-defined words 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.

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.

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

ROMPLUS + BOARD SPECIFICATIONS

- Holds 6—2716 volt EPROMs or ROM equivalent. Each holds 2048 bytes.
- Each ROM resides in the Apple $C800 space any any ROM may be turned on and used when desired.
- An on-board control ROM residing in the CN00 space is activated with a PR#N or IN#N from BASIC. It controls the six ROMs and handles communication between ROMs, including subroutine calls from one ROM to another which allows use of programs larger than 2K.
- 255 bytes of on-board RAM for scratch pad or data storage. It resides at CF00-CFFE. This RAM space is software selectable between this RAM and the top of any ROM you may select.
- Two TTL inputs are available for special control. One may be used with Keyboard Filter for "Shift Key" operation.
- Driver software included to allow usage of other boards using the C800 space in conjunction.

- Upper and lower case characters plus special graphics and characters. One character set is contained on the ROM. Other FONTs may be designed using our FONT-Editor.
- Keyboard MACRO's allow one key to define a complete message. The Macro Editor allows easy definition.
- Text and Graphics may be contained anywhere on page. Two independent pages may be used.
- Characters may be in any of five colors.
- Special editing controls enhance Apple's capability. Clear current page, delete current line, copy to end of line, stop listings, plus easy cursor movements.
- Shift key operation, as well as shift lock.

For custom applications, ROMPLUS + is available without Keyboard Filter at $149. Keyboard Filter is available as a retrofit for ROMPLUS + at $50.

Mountain Hardware, Inc.   **Complete & Tested including powerful Keyboard Filter ROM & full documentation $169.00**
300 Harvey West Boulevard
Santa Cruz, California 95060
(408) 429-8600

SUPERTALKER

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

SuperTalker is a new Mountain Harware peripheral system which allows the Apple II computer to output exceptionally high quality human speech through a loudspeaker 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.

The SuperTalker peripheral system consists of: The SuperTalker peripheral card which plugs into a peripheral slot on the Apple II; a microphone; a loudspeaker; easy-to-use operating software and documentation; plus, two ready-to-run SuperTalker programs.

In order to achieve maximum utility using SuperTalker, the SuperTalker Disk Operating System permits output of human speech under program control with direct 1/0 routines. It also provides a preparation program which permits the creation of voice files on diskette. BASIC program routines are provided which require only one-line statements to output a word or phrase. Routines also support cassette storage.

SPECIFICATIONS:
- Human speech output under program control made easy with fully documented operating system software.
- Hardware includes SuperTalker Card, Loudspeaker, and Microphone for speech input.
- Four software selectable rates for digital speech data entry: 500 Bytes/Sec.; 1 KB/Sec.; 1 KB/Sec.; 4 KB/Sec. Perceived speech output quality improves as rate is increased.
- Operating system software provides for storage of digitized speech on diskette for memory optimization.
- Store about 50 Sec. Real-Time speech output at 2 KB rate on one Apple II diskette.
- Four software selectable settings that control output volume through speaker.
- On-board two watt audio amplifier to drive speaker provided or output through a stereo or P.A. system.
- Frequency Response: Filtered to 300 Hz—3000 Hz human voice range for OUTSTANDING clarity.
- Two ready-to-run programs: ACCENT, a talking language translator, and TALKING COLOR MATH, a talking arithmetic game illustrate program uses.
- VPS, Vocal Preparation System is the Operating System and Editor that leads you to the creation of your own talking programs.

MOUNTAIN HARDWARE, INC.   **Assembled and Tested $279.00**
300 Harvey West Boulevard
Santa Cruz, California 95060
(408) 429-8600

PARALLEL INTERFACE CARD

John Bell Engineering is announcing an Apple II Parallel Interface Card. There are four I/O ports with handshaking logic. The board has two 6522 versatile interface adapters and a 74LS74 for addressing and timing. Each 6522 has two interval timers. This will interface your Apple II to printers, speech synthesizers, keyboards, and other John Bell Engineering products. Inputs and outputs are TTL and CMOS compatible.

J B ENGINEERING   **79-295 Complete kit $69.95**
Post Office Box 338   **79-295 Assembled   79.95**
Redwood City, California 94064
(415) 367-1137

ROMWRITER tm

Firmware in ROM is as fast as your software in RAM, but in ROM it frees up RAM memory space for companion programs. And, there never needs to be a LOAD from disk! Create firmware for your Apple by programming EPROMs with RomWriter.

Many frequently used programs really ought to be installed as firmware. ROM-based firmware permits a ''power up and go'' configuration. Use RomWriter to create firmware for peripherals such as printers or create program cards. By installing EPROMs that you have programmed on Mountain Hardware's ROMPLUS + tm board, program cards of up to 12K in length may be created.

Programs 2716 EPROMs (5V). All 2K or part of the EPROM can be programmed. Installs in a peripheral slot. EPROMs mount in a zero insertion force socket. A switch turns power off to the socket so EPROMs can be inserted or removed without powering-down your computer. A Write Protect switch is provided for programmed EPROMs while running. A $CFFF OFF switch to suppress this command during programming or RUNning. EPROMs can be RUN on RomWriter, or ROMPLUS + tm when creating firmware systems.

Virtually foolproof programming. Specify a Start and End address in the EPROM and either a Disk File name or a starting address in memory. Desired code will be BURNed followed by a VERIFY. Additionally, existing EPROM code can be merged with desired changes to facilitate EPROM debugging. Easy data entry and high reliability are designed into RomWriter. Programmed EPROMs can be RUN while residing on RomWriter or can be transferred to Mountain Hardware's ROMPLUS + board.

MOUNTAIN HARDWARE, INC.	**Complete Software Package**	**$159.00**
300 Harvey West Boulevard	**Purchase together with ROMPLUS + as a Firmware Development System**	**300.00**
Santa Cruz, California 95060	**ROMPLUS separately**	**149.00**
(408) 429-8600		
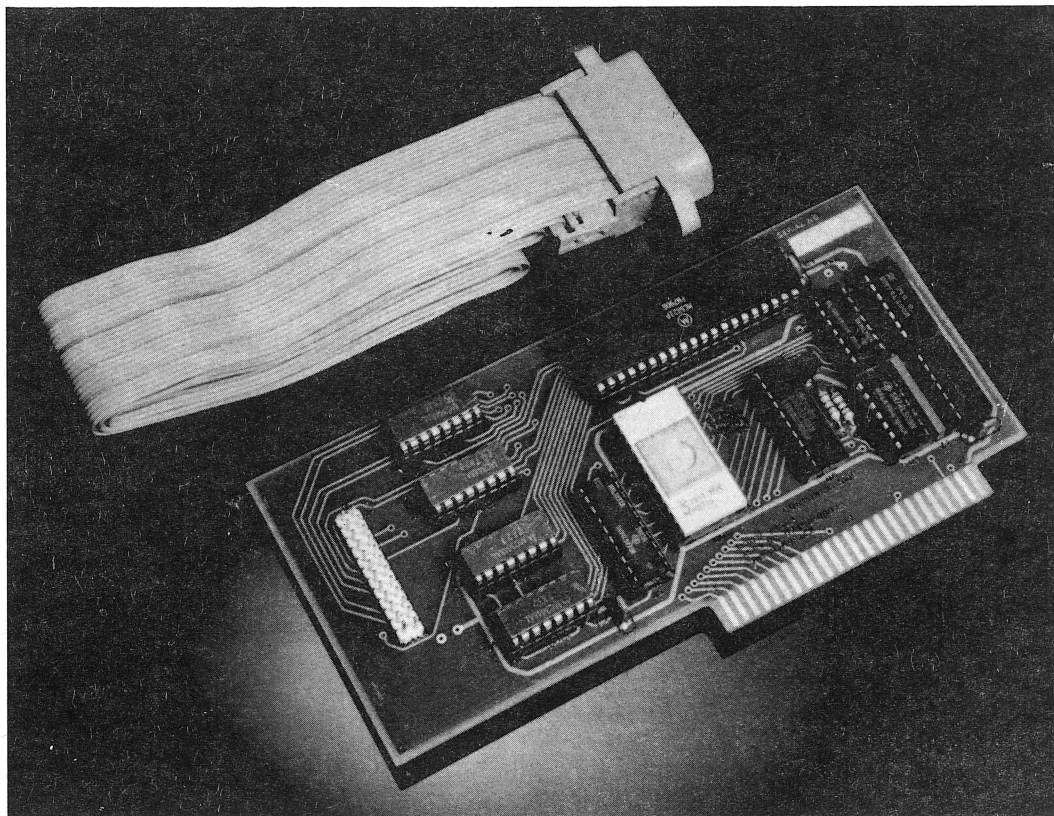
CCS 7490A APPLE II GENERAL PURPOSE INSTRUMENT BUS INTERFACE (GPIB)

Interface your Apple to the IEEE-488 bus. Usable with BASIC (Applesoft of Apple, Integer BASIC. Implements controller/talker/listener function of IEEE STD 488-1978. The GPIB is widely used in the instrumentation field for the interconnection of test equipment with a controller for automatic testing. With the GPIB interface your Apple can control large systems or a single instrument. When used as a talker/listener on the GPIB, your Apple may act as a peripheral device to another controller, i.e., a color graphics output device. Weighs 2 lbs.

CALIFORNIA COMPUTER SYSTEMS   A&T $295.00
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811
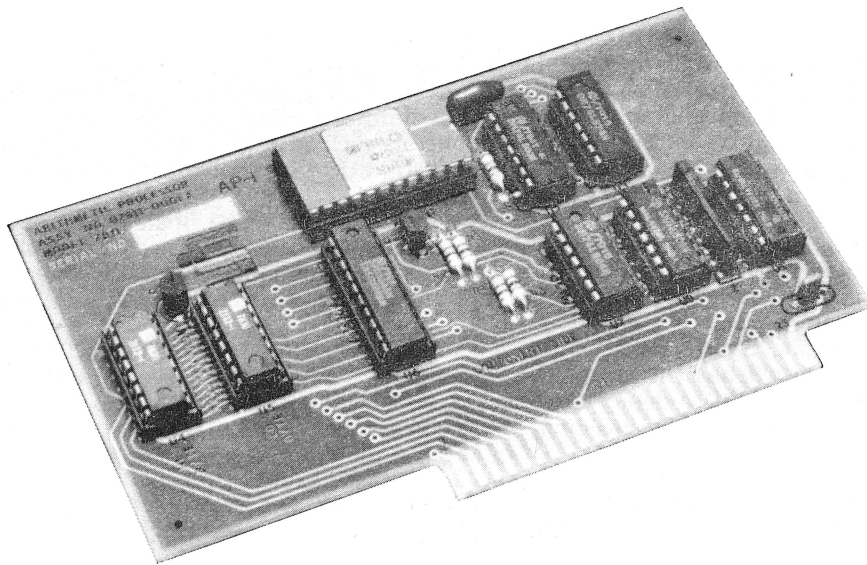
CCS MODEL 7811 B ARITHMETIC PROCESSOR

Adds advanced arithmetic power to your Apple II • 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 trigonmetric 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.

CALIFORNIA COMPUTER SYSTEMS   **Assembled and Tested $399.95**
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811
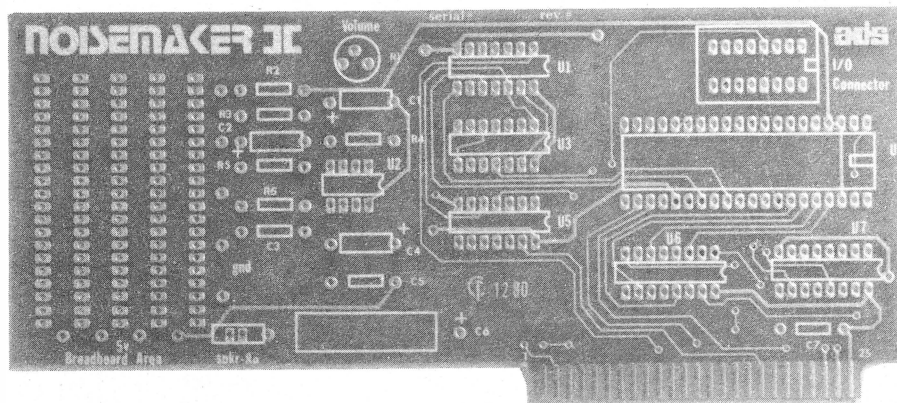
THE ADS NOISEMAKER []

A programmable sound board with on-board audio amplifier for producing gun shots, Laser's and Space sounds, trains, bells, whistles, etc. An infinate variety of sound effects can be programmed and added to computer graphics and games, without slowing down the processor. The Noisemaker [] using the General Instruments AY-3-8910 Programmable Sound Generator (PSG) is fully interfaced to the Apple I I bus and includes an on-board bread board area for use modifications. ADS supplies a comprehensive manual with each Noisemaker [] which covers board construction, software hints, user notes, schematic, parts list and a complete guide to the operation of the GI PSG.

Available assembled and tested or as a blank solder masked, silk screened printed circuit board.

ACKERMAN DIGITAL SYSTEMS, INC.
110 North York Road
Suite 208
Elmhurst, Illinois 60126
(312) 530-8992
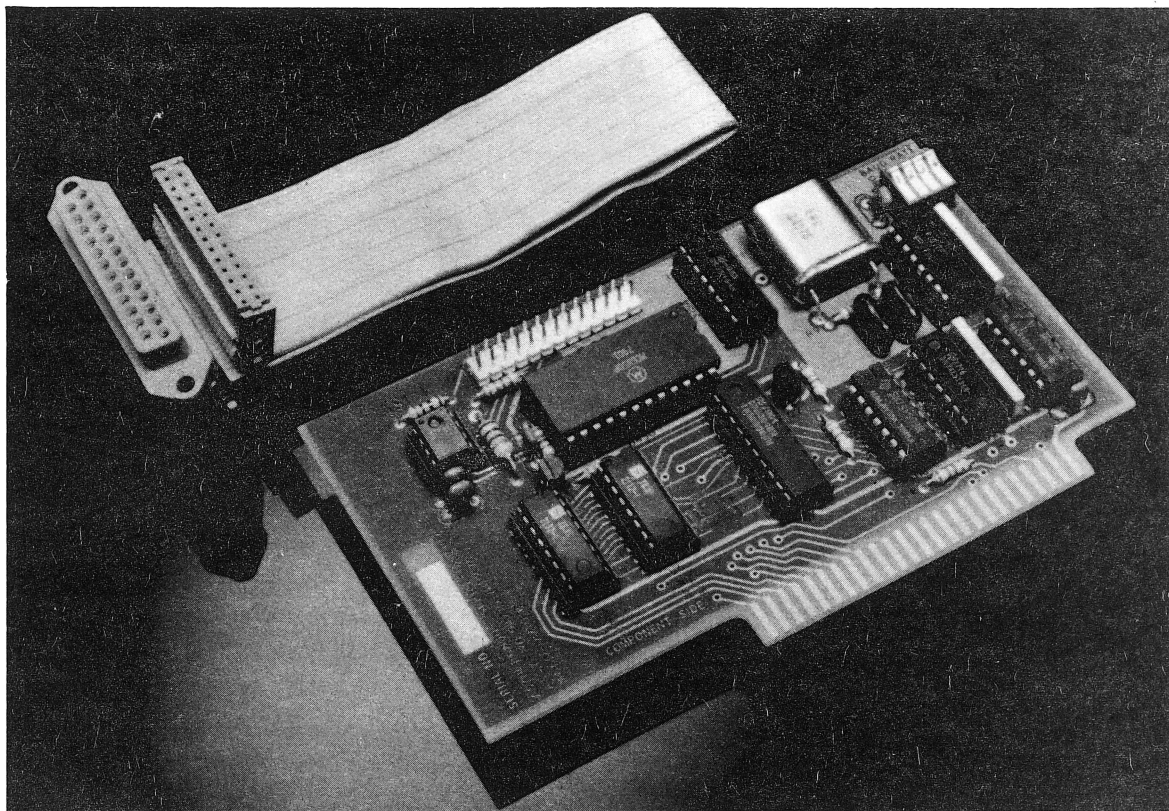
CCS MODEL 7710A ASYNCHRONOUS SERIAL INTERFACE

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 • Allows DMA daisy chain • 134.5 BAUD available for selectric interface • Conforms to RS-232-C (configuration A through E) • Supports half or full duplex operation • DCR type interface • Failsafe RS-232 operation • 14 STD CLK rates 50-19.2K BAUD plus EXT CLK • BAUD rates dip switch selectable • All BAUD rates crystal controlled except EXT • Eight and 9 bit transmission • Optional even, odd, and no parity bit • Programmable control register.

CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811

Kit, less programmed PROMs	**$ 99.00**
A&T, with programmed PROMs	**159.00**
Programmed PROMs only	**24.95**
Blank PROMs only	**19.95**
RAMs (replaces PROMs)	**19.95**

CCS MODEL 7520 AK APPLE II EXTENDER BOARD
CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811

Use for debugging or testing modules in the Apple II
$25.00
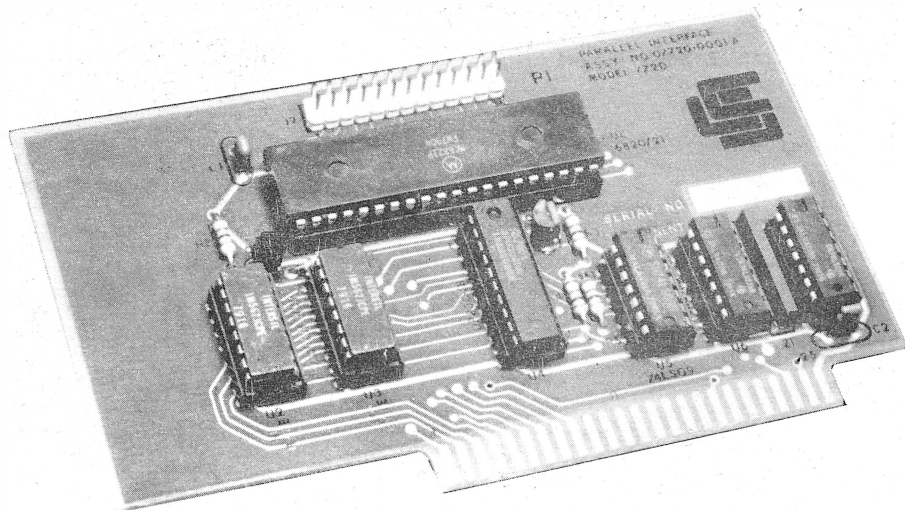
CCS MODEL 7720 A PARALLEL INTERFACE
Two bi-directional 8 bit buses for interface to peripherals • Two programmable control registers • Four individually controlled interrupt input lines; two usable as peripheral control outputs • Handshake control logic for input and output peripheral operation • High inpedance three state and direct transistor drive peripheral lines • Programmable interrupts • CMOS drive capability on side A peripheral lines • Two 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.

CALIFORNIA COMPUTER SYSTEMS	Kit, less programmed PROMs	$ 69.00
250 Caribbean	a&t, with programmed PROMs	119.00
Sunnyvale, California 94086	Programmed PROMS only	24.95
(408) 734-5811	Blank PROMs only	19.95
	RAMs [replaces PROMs]	19.95
	Programmed PROM for Centronics printers	24.95
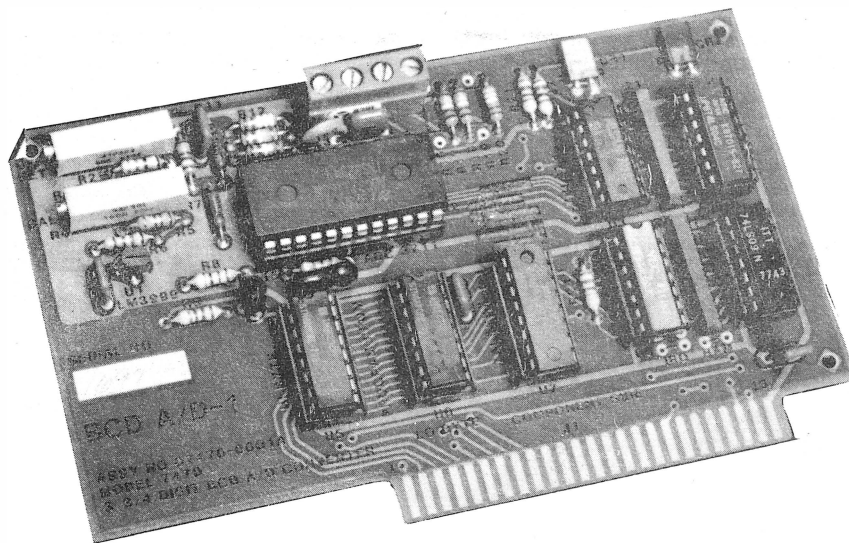
7470A 3¾ DCD A/D CONVERTER
Converts a DC voltage to a BCD number for computerized monitoring and analysis. Typical inputs include DC inputs from temperature or pressure transducers. Single channel A/D, 400 ms per conversion.
CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811
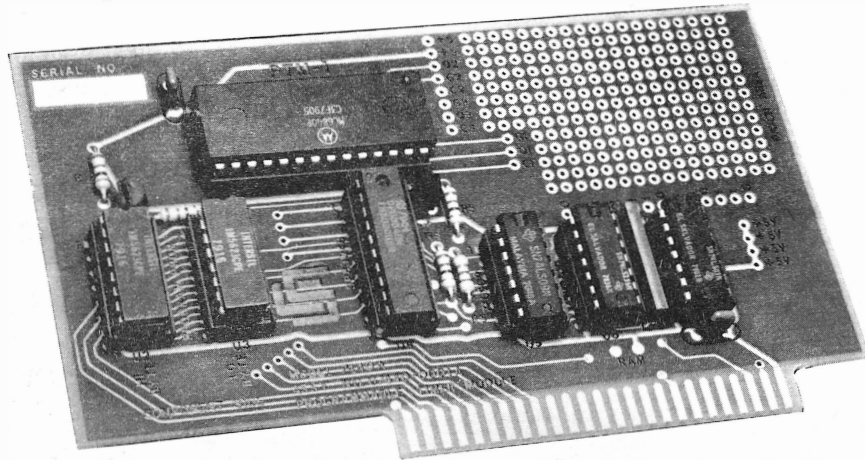
7440A PROGRAMMABLE INTERRUPT TIMER MODULE
Time events in four operating modes—continuous, single shot, frequency comparison, and pulse width comparison. Includes three 16-bit interval timers, plus flexible patch area for external interface. Programmable interrupts, on-board ROM, and much more.
CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811
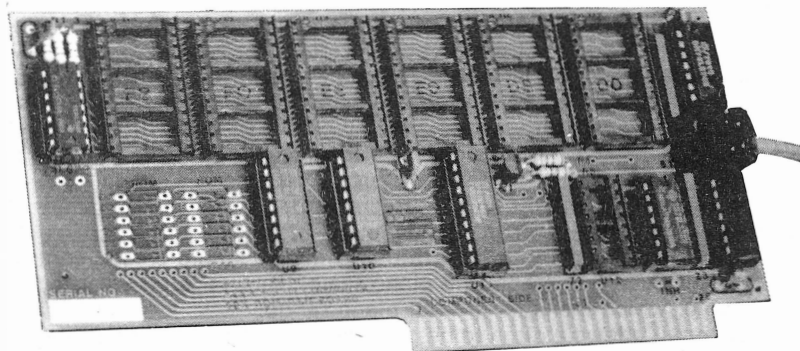
7114A PROM MODULE
Permits the addition to or replacement of Apple II firmware without removing the Apple II ROMs. Available with on-board enable/disable toggle switch.
CALIFORNIA COMPUTER SYSTEMS
250 Caribbean
Sunnyvale, California 94086
(408) 734-5811

APPLE MUSIC

In the beginning there was the APPLE playing the theme from Star Wars or maybe Appleodian, but today the APPLE is entering into some very sophisticated music synthesis up to nine voices. Companies are producing interface boards that will introduce your APPLE to the beautiful sound of music.
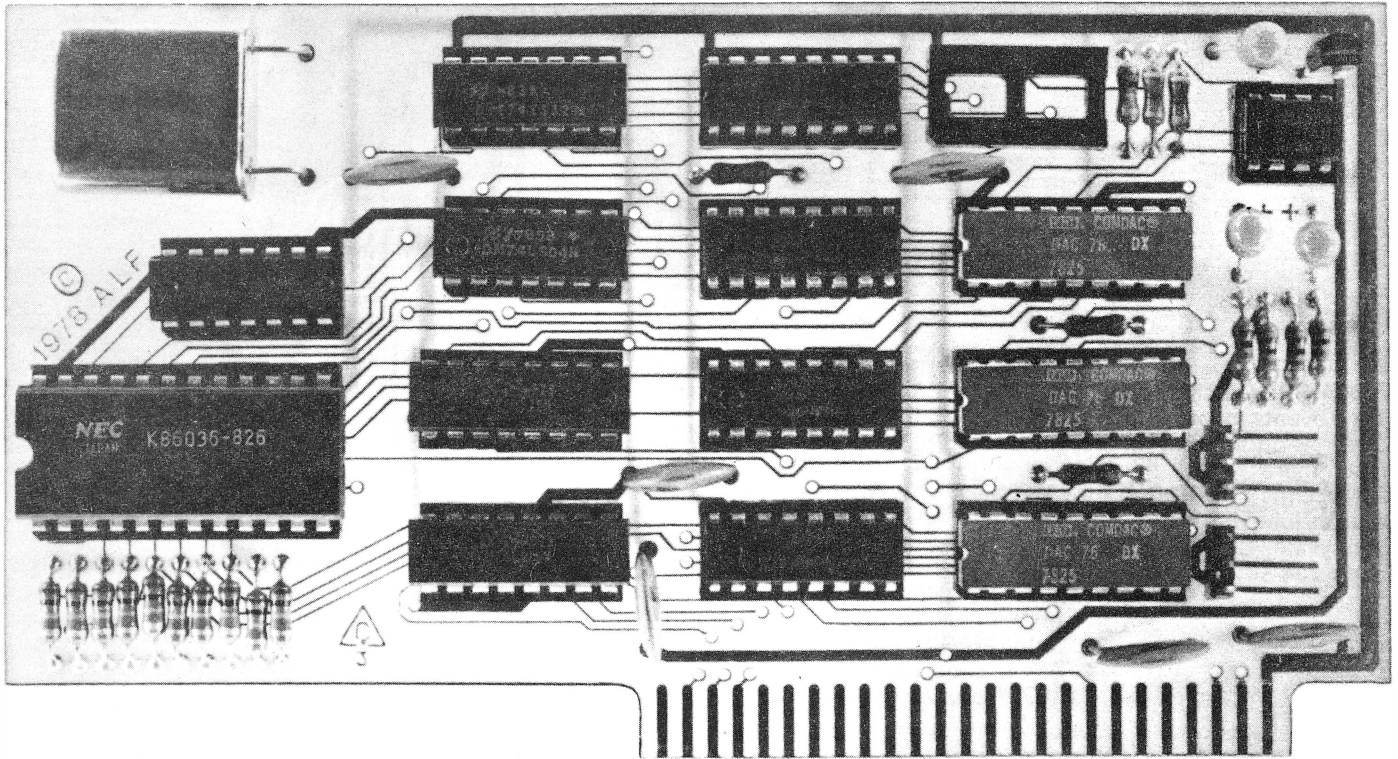
MUSIC SYNTHESIZER

Three simultaneous voices — single circuit card contains three channels. Interactive graphics music entry — 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 outputs — stereo is available when using two or three units. Pitch, envelope, and volume — easily controlled using software provided with unit. Expandable to six or nine 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 % . Save and load songs — using cassettes or disk. Recreational — relative enjoyment factor (REF) typically exceeds 82.

The Hardware (circuitry) of the synthesizer takes advantage of the latest advancements in digital and analog integrated circuit technology. Pitches are produced by an accurate and highly stable crystal-controlled circuit which never requires tuning. The synthesizer can produce half steps (the piano scale), quarter steps, and even slide between quarter steps. An eight octave range is available, which includes the full piano range.

A unique volume control circuit allows a pitch to be produced at any of 256 programmable volume levels. Combined with the powerful software included with each unit, this circuit produces a virtually limitless selection of envelope contours.

Each synthesizer can produce three tones at once, using three nearly identical "channels." Pitch, volume, envelope, and other settings can be selected for each channel independently from the other channels. Two synthesizers can be used for six simultaneous tones, or three for nine tones. Stereo outputs are available when using two or more synthesizers.

With the Apple Music Synthesizer, you can program a piece of music straight from the score, and play it back instantly. Even the most complex pieces can be entered and played back accurately, with perfect timing. During entry, the score as entered so far is shown on the Apple's display in traditional music notation. Measure bars are automatically inserted at the proper places, immediately identifying any incorrect measure lengths. Once entered, a song is easily modified. Grace notes and other embellishments can be added or removed, and the piece played back to see how the modifications sound. While new parts can be added without difficulty.

The synthesizer is particularly useful for trying out new melodies, especially for pieces which are difficult to perform on a piano or which involve more than one instrument.

You don't have to be a musician to enjoy the Apple Music Synthesizer. Whether you want to play songs programmed by others, program them yourself, or just create interesting sounds, the synthesizer is easy to use.

The music entry program (supplied with each unit) allows you to start programming songs right away—no complicated "music languages" to learn. Typing is minimized by an innovative entry system which uses the "game paddle" knobs and interactive graphics capabilities of the Apple computer. One of the knobs is used to select note durations and other functions

using a pointer which moves across the display to the various "menu items" shown (see display photo on front side). The other knob moves a note-shaped "cursor" up and down on a standard musical staff; when the cursor is at the correct note, pressing a button enters the selected pitch. Key signatures are handled automatically by the entry program. A variety of commands, entered using the typewriter-like keyboard of the Apple, simplify music entry and editing. MEASURE:23 for example, causes the score to be displayed starting with measure number 23. Typing PLAY causes the song to be played. During playback, the tempo (speed) of the song can be changed at any time by rotating one of the game paddle knobs. Doubling the speed does not raise the pitch an octave (like a tape recorder would), the frequencies of the notes remain the same at any tempo.

If you're a real software wiz, the kind of person who just can't resist creating wonderful new programs, the Apple Music Synthesizer is ideal for you too. Detailed programming instructions in the manual, plus convenient subroutines, allow you to do your own thing. The CHROMA subroutine is used for chromatic frequencies, sliding, vibrato, pulse width control, and other effects; PERFORM is used for easy control of one to nine command sequences, simultaneously performed.

An empty socket on the circuit card provides access to the three TTL-level square wave pitch outputs (pine 3, 4, and 5) and the mixed audio output (pin 11). Hardware enthusiasts can connect these outputs to their own audio processors for even more versatility.

The programming simplicity, tuning accuracy, envelope control, and other features make the synthesizer a powerful tool in the classroom. Composition, score writing, pitch and interval recognition—the synthesizer is useful in nearly all phases of instruction. Programming is so easy—and fun—that your students will not only be eagerly participating, but many will be interested in developing new programs for study in other musical areas.

The ALF synthesizer, along with an Apple II computer and a home stereo system, forms a complete computer-controlled music synthesis system. The synthesizer is a single circuit card which fits inside the Apple. Audio output cables, with standard phono plugs, are supplied to connect the synthesizer to your amplifier and speakers.

Your Apple II computer should have 24K or more memory (plus any memory needed for the disk system), and a black and white video monitor is recommended (although any good quality television set will work).

ALF part number 10-5-16. Each unit contains an owner's manual, software cassette, circuit card, and audio output cable.

ALF PRODUCTS INC. $265.00
1448 Estes ALF/Applesoft Software 15.00
Denver, Colorado 80215
(303) 234-0871
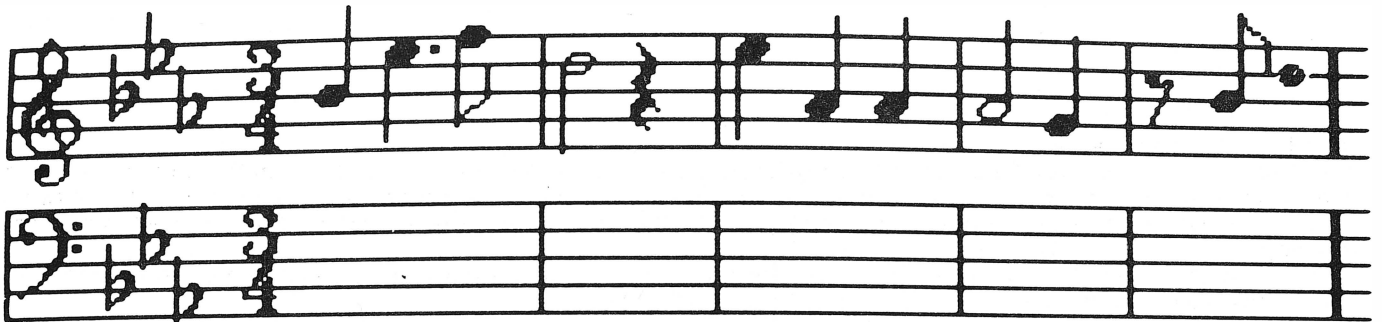
TIMING MODE INPUT BOARD FOR USE WITH THE 10-5-16 APPLE MUSIC SYNTHESIZER

Easy installation — plugs into any Apple expansion slot. Cable plugs into synthesizer socket. Complete software compatibility — just change TSLOT in Entry and Play. Allows dynamic tempo control — makes ritards and accelerandos simple. Automatic playback tempo — "Game paddles" are not required to set playback speed. Allows use of the "Tempo" item — insert tempo items to set or change the playback speed at any point. Uninterrupted "Album" playback — eliminates paddle adjustments during album playback (with DISCO). Select automatic or manual tempo — just set the "suggested speed" to zero for automatic, non-zero for manual. Useful as an input port — electronic experimenters can use the unit as a 6 bit unlatched input port (5 bits when using the synthesizer. Consumes one synthesizer channel — when activated (speed set to zero), one snythesizer channel is not available for music. All channels are available when not activated.
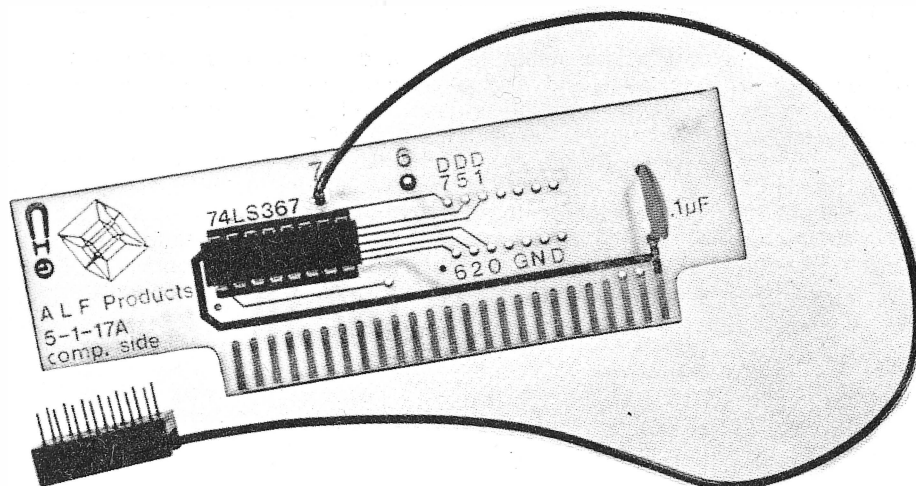
INSTALLATION AND USE

The Timing Mode Input Board is plugged into any Apple expansion slot. The 14 pin "header" (on the wire connected to the board) is plugged into the empty socket on an ALF Apple Music Synthesizer. The header can be plugged in either of two ways so as to aim the wire towards the front or towards the back of the Apple, whichever you prefer. Make sure all 14 pins go into the socket.

Line 20 in Entry and Play is normally 20 TSLOT = 8 and must be changed to the proper slot number. For example, if you plugged the Input Board into slot 3, change line 20 to 20 TSLOT = 3.

If the suggested speed is zero, then song tempo (playback speed) will be controlled by the Input Board automatically; if the speed is non-zero, song tempo will be controlled by Paddle 0 as usual. The song must contain a TEMPO item in one of the channels prior to the first note, rest, or call to a subroutine containing a note or rest. See the TIMING MODE section in your synthesizer manual for further details, especially when using three synthesizers.

When the Input Board is activated, it uses one channel of one synthesizer. The channel used must be Channel 0 of the synthesizer the InputBoard'sheader is plugged into. When using Entry or Play with two or three units, the header must be plugged into the synthesizer in the highest numbered slot when using two units, and the next-to-highest numbered slot when using three units.

TECHNICAL

The Input Board can be used to read the status of 6 TTL signals. The status can be read in bit 0, 1, 2, 5, 6, and 7. The inputs of these bits are marked on the circuit card as D , D1, D2, D5, D6, and D7. Bits 6 and 7 have an additional connection point labeled 6 and 7. These six signal inputs connect to an 8T97 or a 74LS67 buffer which enables the inputs into the CPU's data bus whenever any of the 16 "device select" memory addresses associated with the particular expansion slot occupied by the Input Board are read. These memory addresses must not be written to.

ALF part number 10-5-17. Each unit contains a circuit card and an instruction sheet.

ALF PRODUCTS INC.   **$20.00**
1448 Estes
Denver, Colorado 80215
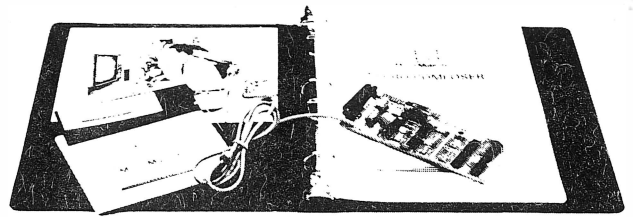
MMI MICRO COMPOSER

The MICRO COMPOSER is an APPLE II compatible, low-cost music system designed by the folks at MMI. Our music software was designed by leading experts in music education. A simple step-by-step instruction manual leads you through entering, displaying, editing, and playing music with up to four voices—soprano, alto, tenor, and bass. You can change the sound of each voice to reed, brass, string, or organ sounds and you can even color your own music sounds!

- Play up to four simultaneous voices
- See all 4 voices at the same time you're hearing the music—a must for music editing!
- Enter music notes by a fast, simple and well-tested coding system.
- Program the pitch, rhythm, and timbre of the music. Tempo is varied by the Apple paddle.
- Choose 7 different tone colors for each voice or create your own tone color.
- Compose, edit, display, and play music through an interactive, command-driven language that's easy to learn.
- Save your music on disk or cassette.
- Hear quality music sound at low cost through the MICRO MUSIC tm DAC card. No amplifier needed! Designed for MMI by Hal Chamberlin and Micro Technology Unlimited.
- Select from future MMI music instruction software to accompany the MICRO MUSIC DAC.

Comes with an instruction manual, software disk or cassette—in either Integer or Applesoft ROM BASIC, and the MICRO MUSIC DAC music card. Plug the MICRO MUSIC DAC into the APPLE extension slot and connect the audio cable to a speaker.

MICRO MUSIC INC.   **$220.00**
309 Beaufort
University Plaza
Normal, Illinois 61761
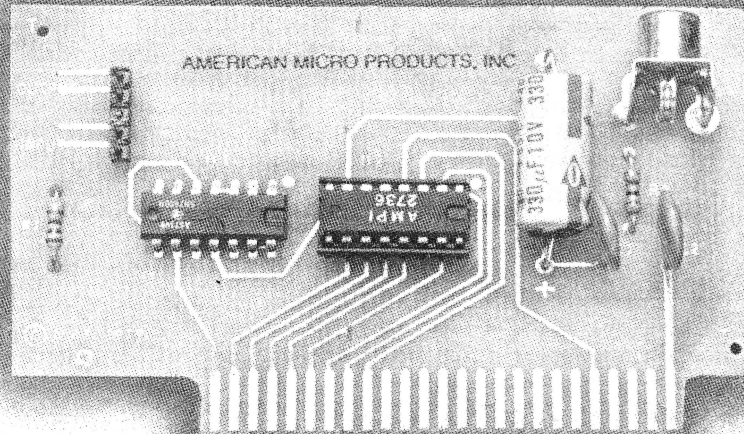
JUKE BOX

The JUKE BOX is an extremely flexible low cost synthesizer designed to plug into any 48K Apple computer (Applesoft or Apple plus). Each board is capable of producing three simultaneous voices through three separate channels. Pitch, rhythm, tempo, attenuation, and envelope can be selected and controlled for each channel independently from other channels. An eight ohm speaker can be plugged into and driven by the synthesizer.

Up to six music boards may be inserted to create eighteen notes. In addition, cards can also be daisy chained to increase the number of voices per speaker. As an illistration, a computer containing four synthesizers might be configured in the following manner. One speaker per board would enable the user to produce quadraphonic sound, three notes per speaker. These same boards could also be daisy chained into sets, one speaker connected to each set of cards. This would generate stereophonic music with six voices per speaker. As a third possible combination, twelve voices of monaural sond would result if all four boards were daisy chained and one speaker was used. For those applications such as sound effects, where quality is of secondary importance, the synthesizer can even be connected directly to the Apple internal speaker.

AMERICAN MICRO PRODUCTS INC.
705 Bowser
Richardson, Texas 75080

ADD-ON MEMORY

If you purchase your Apple with 16K of memory, you may have found that larger programs cannot fit into your memory. If you choose to add a disk drive, added memory is almost a must. Two additional rows of 16K each can be added. Each row consists of 8 4116 memory "chips" that are currently being offered by Apple and many independent sources. These chips are manufactured by several companies and they range in operating speed. It is suggested by most dealers that these devices operate no slower than 250 nanoseconds. Although more expensive, your safest buy is the add-on kit supplied direct from Apple. They also supply a software program called Ram Test which will test all of the addresses on each device.

Offers a pre-packaged 16K Apple "Upgrade" kit which includes eight tested and guaranteed chips, the memory select units that plug into the sockets on the end of each row, and installation instructions.

ITHACA VIDEO
P. O. Box 91
Ithaca, New York 14850
(607) 257-0190

TRAP 65

— Prevents from "hanging up" via execution of unimplemented opcodes! Causes your monitor to display location of bad op code!
— Our computers have stopped crashing!
— Debugging easier!
— Easy to install—plugs into 6502's socket.

TRAP 65 is currently being used to insure that there are no bad opcodes in programs before submittal for ROM masks!
We are using TRAP 65 in experiments on extending the 6502's instruction set—PHX, PHY, INCD.

EASTERN HOUSE SOFTWARE   **$149.95**
3239 Linda Drive   (Add $4.00 postage, $10.00 foreign)
Winston-Salem, North Carolina 27106

HARD COPY GRAPHICS TERMINAL

The Panographic-84 is a precision X-Y plotter with 100-step resolution in both directions; it is driven by zero-drift, adjustment-free stepping motors. Plotter programs can be written in BASIC or machine language. Interface to Apple is via our Parallel Printer card. Soon to be available is a chart reader that will allow you to use the plotter as an input device.

Pan Dynamics, Inc.	**Assembled Plotter, Computer-operated Pen Lifter, Molded Cover**	**$1400.00**
2950 Nebraska Avenue	**Kit, without Lifter and Cover**	**995.00**
Santa Monica, California 90404	**Pen Lifter Kit**	**85.00**
(213) 829-2332	**Cover**	**85.00**

MR-500 MARK SENSE CARD READER

Now, all you need is a standard #2 pencil, a card, and our new MR-500 mark sense card reader to quickly and easily enter data into your favorite microcomputer.

One — program the card by marking with the pencil. Two — feed the card into the reader slot. Three — the reader automatically turns on, the card is fed through, and data is instantly entered into memory. It's the simple low-cost alternative to keyboard data entry.

The applications for our low-cost MR-500 are endless. For small businesses, it's ideal for inventory, time cards, labor distribution (just to name a few). Educators will find that the MR-500 streamlines test scoring, attendance records, and grade reporting.

The MR-500 is lightweight — 4 lbs. Compact — a 4½-inch cube.

CHATSWORTH DATA CORPORATION   **$750.00**
20710 Lassen Street
Chatsworth, California 91311
(213) 341-9200

APPLE SILENTYPE THERMAL PRINTER
An advanced text and graphics printer for the Apple II personal computer, the quiet Silentype thermal printer delivers paper copies of anything the computer can display on a video monitor or television screen.

Completely silent when printing, the Silentype makes only a slight sound during each line feed. A seven-dot, thick film printing element produces five- by seven-dot characters and graphics on standard thermal paper. The Silentype prints up to 80 characters per line on 8½'' wide, roll-fed paper. The Apple II powers the printer.

Flexibility is built into 2K bytes of firmware on an interface card supplied with the printer. Users can change parameters directly, or from within via applications programs.

Keyboard-adjustable parameters allow selection of: print displays in black-on-white or white-on-black modes, eight-dot intensity values for varied printfaces, a simultaneous print-and-display mode, and print-displayed-pages command, unidirectional or bidirectional printing, line space in 1/6'' increments, left and right margins, and paper advance length for the form-feed command.

Other features include upper case Ascii only; graphics with the full set of 96 character; upper and lower case Ascii; and continuous text. Graphics resolution is 3600 dots per square inch.

Typical graphics printing rates are one minute per screen in the bidirectional mode, and one-and-one-half minutes in the unidirectional mode. Graphics printing speed is up to 240 dot-columns per second. In text mode, the maximum printing rate is 40 characters per second.

Suggested retail price for the Silentype thermal printer includes interface and Apple's extended warranty.

APPLE COMPUTER, INC.   **$595.00**
10260 Bandley Drive
Cupertino, California 95051
(408) 996-1010

SYMTEC LIGHT PEN
The Light Pen is a joint project between Symtec Corp. (hardware), ABW Corp. (software and documentation), and Computerland of Southfield (marketing). It comes ready to use, and is supplied with full documentation and software. It will operate in text, low res., and high res., graphics modes, and is capable of resolving one high res. point. You will find below a complete description of each component of the package and other information of interest.

From the users point of view, it is possible to have the Light Pen perform any type of system control which normally can be accomplished through the keyboard. Selecting programs to run from the disk catalog, turning on a printer, and basic menu select functions within a program can all be done.

Hardware: Pen, cord, and interface card.
   The interface card plugs into the Apple bus, and has a lead to be clipped to the video jack from the rear.
Software: Six Programs.
   The software has pen servicing subroutines, a calibration routine, and demo programs, including Light Pen checkers. The software is designed to be used in slot 5, but can easily be changed to operate in any slot 1-7, and the instructions for doing so are included in the manual.
Documentation: The manual contains complete installation, software and operational descriptions. One of our aims was to produce a user oriented manual which contained straightforward descriptions that the beginning Apple programmer could understand if he really wished. Further, there are descriptions of the high res., low res., and text modes with memory maps. This information is useful even without a Light Pen. A table of contents from the manual is included in this package and manuals are available separately at a cost of $12.00

COMPUTERLAND   **$249.95**
29673 Northwestern Highway
Southfield, Michigan 48034
(313) 356-8111

EPROM
Add capability to your system monitor or BASIC for business or other applications. Add commands to the operating system.

New operating systems can be put into permanent memory with our EPROM programmer and plugged directly into your APPLE II board with our INTEL 2716 socket adaptor.

Add to or replace existing APPLE II ROM software with operating systems of your own design. Other software systems similar to FORTRAN, FOCAL, COBOL, ALGOL, other BASIC's, etc. may be incorporated into your APPLE II ROM.

FEATURES:
   • 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

ADVANTAGES:
   • Fill two empty ROM slots on Apple II board.
   • Replace existing ROM chips on APPLE II board.
   • Put printer driver in permanent memory.
   • Put MICROPRODUCTS Assembler in permanent memory.
   • Put other peripherial interfaces into permanent memory.
   • MICROPRODUCTS will custom program EPROM's with your program on request.

MICROPRODUCTS
1024 17th Street
Hermosa Beach, California 90254
(213) 374-1673

COMPUTER/TYPEWRITER MECHANICAL INTERFACE

The Rochester DATA I/O Pak is an electro-mechanical device designed to interface between a conventional powered carriage return electric typewriter and any digital computer configured with a suitable electronic interface.

The I/O PAK consists of 52 solenoids (coils) riveted to a printed circuit board. A plunger with a spring is inserted and rests in each coil, extending out of the bottom of the printed circuit board. Each of the coils is actuated by selecting one X and one Y lead of a matrix. The I/O PAK mounts or rests on the typewriter by its own weight. Two 1/8'' x 1/2'' white plastic washers are taped to the typewriter (double-sided sticky tape) one on each side of the space bar. The I/O PAK has four adjustable mounting screws. The two lower ones rest in the washers. For normal typewriter use, simply life the I/O PAK off. It can be replaced just as easily; there are no other modifications required to your typewriter.

The lower half of our plunger shaft is nylon. The nylon strikes the typewriter key. The nominal force required to actuate a typewriter key (shiftlock) is about three ounces. Our solenoids are designed to closely match the operating force of a normal typist. The nylon will not leave a mark on the keys. Incidentally, the average secretary will type at 65 words per minute or 325 characters per minute. Since the I/O PAK can drive your typewriter to the limit, say 15 CPS, you can generate 180 words per minute.

Software for the Apple resides in upper memory, away from your programs and occupy about 500 bytes. The software will operate in all memory size machines and is available on disk and cassette. The software is self-prompting and permits you to adjust every conceivable typewriter timing variable. Once you have done this for your typewriter you can store the program.

AMERICAN INTELLIGENT MACHINES
Post Office Box 48
500 Milwaukee Avenue
Prairie View [Half Day], Illinois 60069
(312) 634-0076

COLOR-KILLER MODULE

For your early model Apple II.

Upgrade your early Apple II to add the Color Killer found in current production versions.

See ''Rainbow,'' Vol. 1, No. 3. Page nine for what a color killer can do for your Apple. Then do it the easy way with a Color-Killer Module.

- Install in minutes — just plug in.
- Soldering or main board removal **NOT** necessary.
- May be easily removed at any time.
- Complete instructions included.
- Module shipped prepaid from stock within 24 hours after receipt of check or money order for $10.
- Include serial number of your Apple II.
- Colorado residents include 3.5% sales tax.

MEMORY ENTERPRISES
1411 Kalmia Avenue
Boulder, Colorado 80302
(303) 449-6454

EXTENDER CARD

Lifts IO boards 4'' above chassis. All lines labeled and numbered. Convenient test points for all lines.

MICRO AUSTIN   **$24.50**
Post Office Box 14408   **Order AP 2.0**
Austin, Texas 78761

APPLETHROTTLE

That's right! The APPLETHROTTLE will turn your game paddles into a speed controller. By simply pushing a button, you can stop your computer for as long as you want. Release the button, and your computer enters a slow-motion mode with one paddle controlling the speed. And if that isn't enough, look at these additional features:

- Plugs into any slot
- Works with machine language, Integer BASIC, and Applesoft
- Normal — slow — stop
- Use to LIST, TRACE, RUN, etc.
- NO SOFTWARE to load
- Unveil program secrets

And there's more! No more multiple LIST commands to view small program sections. With the APPLETHROTTLE, you'll be able to list or trace long programs while watching your program flow into slow-motion. So get in control with the APPLETHROTTLE and order yours today!

WEST SIDE ELECTRONICS
P. O. Box 636
Chatsworth, California 91311
(Shipping paid in Continental U.S.A. California residents add 6% tax, others add 10%)

PROGRAMMER'S AID #1

Programmer's Aid #1 is a ROM-based library of routines to simplify and enhance you... programs. Its capabilities include:

- High-Resolution Graphics Generation
- Program Renumbering and Linking
- Tape Verification
- Musical Tone Generation (12 timbres and 5 octaves)
- RAM Testing
- Machine Language Program Relocation

Programmer's Aid #1 is packaged as a single 2K-byte ROM to be inserted in socket D0... the APPLE II. The routines upon which it is based are completely documented in the manual which accompanies the pa...kage.

(Order No. A2M0019)

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 996-1010

ROBOT I

ROBOT I is a computer-controlled car. It is radio controlled—no wires to the car—for...

Simply plug the peripheral control card into an available peripheral bus connector in... tapes, add batteries, and you're up and running. A few short minutes with the ROBOT... writing your own ROBOT I control programs easily in BASIC.

Used with the Heuristics Model 20A SpeechLab tm voice recognition unt, the ROB... spoken command. Simple commands such as "Left Turn," "U Turn" may be easily pr... called up by voice when desired while watching the car perform the intended sequenc...

Using the computer to store sequences of commands given will allow the user to imp... such as "Come Here," for example.

ROBOT I car action control may consist of pre-programmed routes, interactive co... Model 20A SpeechLab, or a combination of these techniques. Car Motion (forward/stop... control and direction (left/straight/right) may be changed while the car is moving or s... distances up to about 300 feet.

ROBOT I comes complete with car, radio-link controller, Apple II peripheral interface... cassette tape, and instruction manual. The car and radio-link are warranted for 30 days... one year.

FEATURES SUMMARY

Commands Motion Direction — Forward, Reverse, Stop, Left, Right, Straight
Peripheral Interface — Apple II Computer
Programming Language — BASIC or assembly language
Manual Operation — Car controlled directly from controller without computer
Car Size — 30 cm x 18 cm x 10 cm (12'' x 5'' x 4'' H)
Car Colors — Red, White, Yellow, Blue
Batteries (not supplied) — Car requires 4 ''C'' size cells. Controller requires one...
Weight (without batteries) — 2 Kg (4 lbs.)
Warranty — Controller one year. Car 30 days.

HEURISTICS, INC.
900 North San Antonio Road
Los Altos, California 94022
(415) 948-2542

SUPERCHIP

Enhance the text-processing capabilities of your Apple computer with Superchip. The... OM firmware chip, which plugs into the Apple with no modification required, adds the full ASCII character set, including... ower case, plus 31 other non-ASCII characters. It also enhanced editing capabilities for program and data modification.... he chip is compatible with existing Apple programs—Integer BASIC and Applesoft.

Used in conjunction with a special character edit cassette, Superchip allows you to... format. With this feature, you can create entire character sets, such as foreign alphabe... notation and game pieces.

ECLECTIC CORPORATION
2830 Walnut Hill Lane
Dallas, Texas 75229

UPPER & LOWER CASE CONVERSION

Keyboard for your Apple. Add 2 I.C.'s and some jumpers for full upper-lower entry on y... r keyboard. Plans fit for Xerox and post.

W. Helm
1200 Newbury Road, #11
Newbury Park, California 91320

D. C. HAYES MICROMODEM IItm

FEATURES

- Auto-Answer
- Auto-Data Transfer
- Supports Originate Mode
- FCC Registered
- On-board ROM firmware
- Manufactured by D. C. Hayes Associates, The Micro-modem Specialists
- Direct connects your Apple II with any time sharing computer in North America
- Auto-Dial
- Bell System 103 Compatible Modem
- Supports Answer Mode

Direct-Connect Microcoupler. No acoustic coupler distortion or loss

- Available through your local Computer Store
- Backed by the D. C. Hayes Associates Warranty
- Greatly expands your present capabilities
- Extremely simple to connect

The D.C. Hayes Associates Micromodem II tm package is a complete data communications system specifically designed for your Apple II personal computer system. It consists of two microcomputer products and two connecting cords. The first unit, the Micromodem II plugs directly into your Apple II. It provides all the functions of a serial interface card plus programmable automatic dialing and answering. The on-board ROM firmware adds remote console, terminal mode and simplified implementation of more sophisticated applications with BASIC programs.

The Microcoupler is supplied with the Micromodem II. It is registered with the FCC and allows you to connect directly into the telephone system. It is compatible with all North American standard telephone lines and FCC approved for direct connection in the U.S.A. The unit is not approved for use on equipment originating calls in Canada; however, calls going into Canada and Mexico are accepted by their equipment. You need no additional equipment from the telephone company. Because this is a direct connection, there is none of the distortion associated with acoustic couplers. It was those distortions that caused losses in transmissions. Now your communications are processed with incredible accuracy.

The Micromodem II is very easy to install. Simply insert the Micromodem II circuit board into any Apple II expansion slot after slot 0. Then plug one end of the ribbon cable into the circuit board and the other end into the Microcoupler tm. Snap one end of the telephone cable into the Microcoupler and the other end into your standard modular telephone jack. You are now completely installed. Just notify the telephone company that you are using an FCC registered device. There is no extra telephone company equipment needed.

SPECIFICATIONS

Data Format	Serial, binary, asynchronous 7 or 8 data bits, 1- or 2-stop bits odd, even, or no parity.
Lower case characters	Can be optionally converted to upper case, or can be passed through unmodified.
Firmware	1024 byte read only memory (ROM)
Power consumption	1.5 W Typical
Card size	7'' x 3'' including connector fingers
Microcoupler size	5 1/2'' x 3 1/4'' x 1 3/8''
Modem compatibility	Bell System 103-compatible originate or answer mode, dial pulse dialing and auto-answer — -50 dBm receive sensitivity, -10 dBm transmit level, 110 or 300 baud data rate
FCC registration	FCC Registration No. B1986H-62226-PC-E. Ringer equivalent 0.4B. Connects with modular jacks RJ11W or RJ11C.
Supplied with	Modem interface card, firmware in ROM, Microcoupler tm, connector cables, owner's manual.

D.C. HAYES ASSOCIATES, INC. $379.00
10 Perimeter Park Drive
Atlanta, Georgia 30341
(404) 455-7663

GRAPHICS TABLET

The Graphics Tablet is an image input device that allows the user to enter pictorial information directly (by sketching or tracing) from:
— maps and photographs
— logic diagrams and schematics
— histograms
— architectural drawings
— fine art

Tracing a shape on the tablet surface converts the image to digital values. This information is displayed on the video monitor and may be stored on disk for later processing by the Apple.

The 11'' x 11'' tablet surface area facilitates entry of large and complex figures. Line segments may be specified by their endpoints, allowing lines to be accurately drawn by hand. A reducer function assists the user in doing detailed work. Area and distance calculations (in user-specified coordinates) may be performed on the resulting figures.

Powerful software provides a comprehensive set of functions selected with the stylus from a menu. This software is written in Applesoft BASIC so the user may easily change or add menu functions to suit a particular application.
— Direct input simplifies production of complex images
— Hand calculations of graph coordinates and figure dimensions are eliminated
— Coordinated cursor allows function selection from command tables on tablet
— Control program in Applesoft BASIC makes for easy user modification
— Tablet provides 167 points/inch resolution for detailed figures
— Allows user specified functions

Unit consists of stylus, external digitizing tablet, and plug-in interface card.
Tablet Size: 15'' square (11'' square active area), 1'' high
Resolution: 167 points per inch
Input Modes: Continuous or upon command
Data Rate: Up to 100 coordinate pairs per second
Scaling: User selectable
Minimum System Requirements: 48K RAM, Applesoft BASIC, Disk II
Supplied with:
— Tablet, Interface Card, Connecting Cable and Stylus
— Manual and Transparent Mylar Overlay
— Control Firmware in ROM
— Software Programs on Diskette

APPLE COMPUTER, INC.   **$795.00**
10260 Bandley Drive
Cupertino, California 95014

ROM SOFTWARE LIBRARY

Programmer's Aid #1 is the first of a series of software packages from Apple Computer designed to improve and amplify user programming techniques.

The Programmer's Aid Package is a ROM based library of routines whose capabilities include high resolution graphics, program renumbering and linking, tape verification, tone generation, RAM testing and machine language program relocation.

The Programmer's Aid routines are designed for use with the Apple II computer's integer version of BASIC.
APPLE COMPUTER, INC.   **$50.00**
10260 Bandley Drive
Cupertino, California 95014

JOYSTICK UNIT

According to its manufacturer, this new full-range joystick has been designed to plug directly into Apple's game 1/0 connector. With each joystick are two switches and two trim-pots for adjusting to any Apple II and any application. Quantity discounts are available, and delivery is 30 days ARO.
MICROPRODUCTS COMPANY   **Single Joystick $39.95**
1128 19th Street   **Double Joystick $79.95**
Santa Monica, California 90403
(213) 393-8371

TAPE RECORDER CONTROL

ROR and Candex Pacific have announced a relay activator to start and stop audio tape recorders via the REMOTE jack. The activator plugs into the GAME I/O connector on the Apple II, and is controlled with PEEK and POKE commands. Its connector allows the game controls to plug into it so that both devices can be used simultaneously.
Candex Pacific   **$24.95**
693 Veterans Boulevard
Redwood City, California 94063
(415) 364-8427

MICROBOX

MICROSTIK
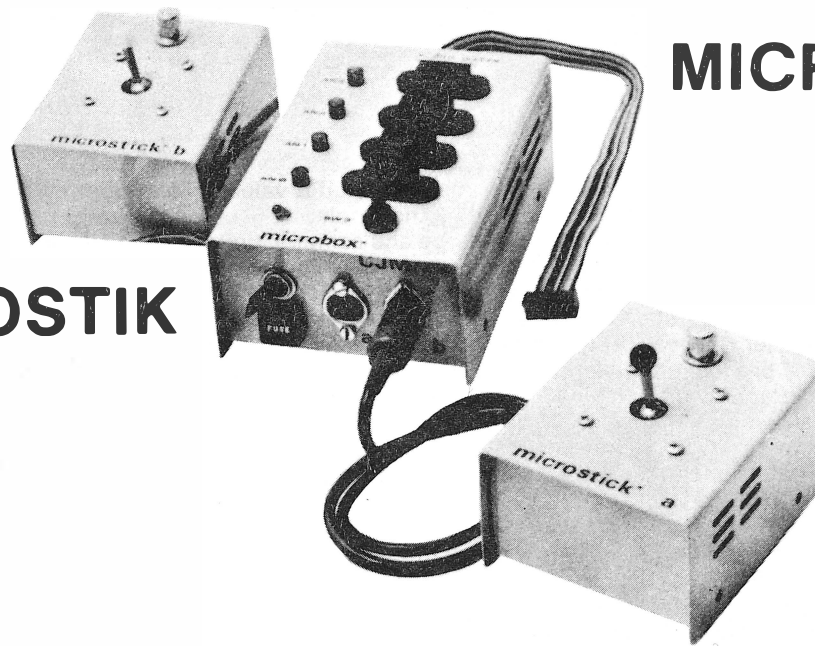
MICROBOX AND MICROSTIK

A SIMPLE COMMAND from the Apple keyboard or a Basic Program can switch an external device. Connect AC loads, such as lamps, motors, relays or solenoids directly through the MICROBOX's 4 AC OUTLETS. Loads can range from 0 to 220VAC and draw up to 200 Watts each. Solid State Switching ISOLATES the load from your Apple for complete safety. Four LEDs provide a visual on/off status of each load.

A complete instruction/tutorial manual is included with the MICROBOX.

The MICROSTIK is a sturdy, two axis joystick. Metal cable connectors assure trouble free usage over time, and enable extension cables to be added easily. Use the MICROSTIK to add real-time input to your game, graphic or experimental programs. Each MICROSTIK contains a PUSHBUTTON for added input possibilities.

CJM INDUSTRIES	
316B Victory Drive	
Herndon Industrial Park	
Herndon, Virginia 22070	
(703) 471-4291	

MICROBOX	**$109.96**
MICROSTIK (each)	34.95
Demo Cassette	9.95
MICROSET	164.95
12 foot Extension Cables	6.95
Relay Modules	WRITE
Solenoid Modules	WRITE

APPLESHIFT — A UPPER/LOWER CASE MODIFICATION FOR THE APPLE II

A package containing instructions for hardware modification of your Apple keyboard, machine language subroutines for input and screen display (lower case letters appear on your screen as upper case letters in normal mode; lower case letters appear as upper case letters in inverse mode) and an INTEGER BASIC demonstration program called TEXTPAGE.

TEXTPAGE allows you to enter, edit, store on disk, and print (using your own driver) 55 lines of 80 characters. Disk TEXTPAGE requires a DOS system with at least 24K. Tape version (available with listings only, no tape) needs 16K.

C&H MICRO	**$29.95**
P. O. Box 2161	
Glen Ellyn, Illinois 60137	

BUSY BOXtm

MicroMint introduces a new wireless AC remote control interface for the Sears and BSR X-10 home control system. Use your Apple II provide complete home security through control of lights, appliances and motors with a few simple Basic commands. Buss compatible with virtually all microcomputers. Completely assembled and tested.

THE MICROMINT INC.	
917 Midway	
Woodmere, New York 11598	
(516) 374-6793	

Busy Box	**$79.95**
Cable and adapter for Apple II	29.95

LIGHT PEN

A low cost light pen is now available for simple installation and immediate operation in applications such as bar graphs, charts, and games. The Apple II Light Pen is supplied with three demonstration programs on cassette.

The Pointer software driver performs seven functions which include selection of graphics mode and page two display, search for X and Y ordinates, a test for odd/even Y ordinate, set page one display, and return to calling program.

Programma International, Inc.   **$34.95**
3400 Wilshire Boulevard
Los Angeles, California 90010
(213) 384-0579

APPLE II JOYSTICK

The PROGRAMMA JOYSTICK is an input peripheral that attaches to the Apple II Computer's game I/0 Port. The JOYSTICK is a must for the serious game player, and it offers a degree of linearity not currently available with other joysticks. The ease of manueverability and the availability of the ''functional'' switches make the PROGRAMMA JOYSTICK a much needed enhancement to any Apple II Computer System owner. The PROGRAMMA JOYSTICK comes completely assembled and tested, including a User's Guide.

PROGRAMMA INTERNATIONAL, Inc.   **$49.95**
3400 Wilshire Boulevard
Los Angeles, California 90010
(213) 384-0579 • 384-1116 • 384-1117
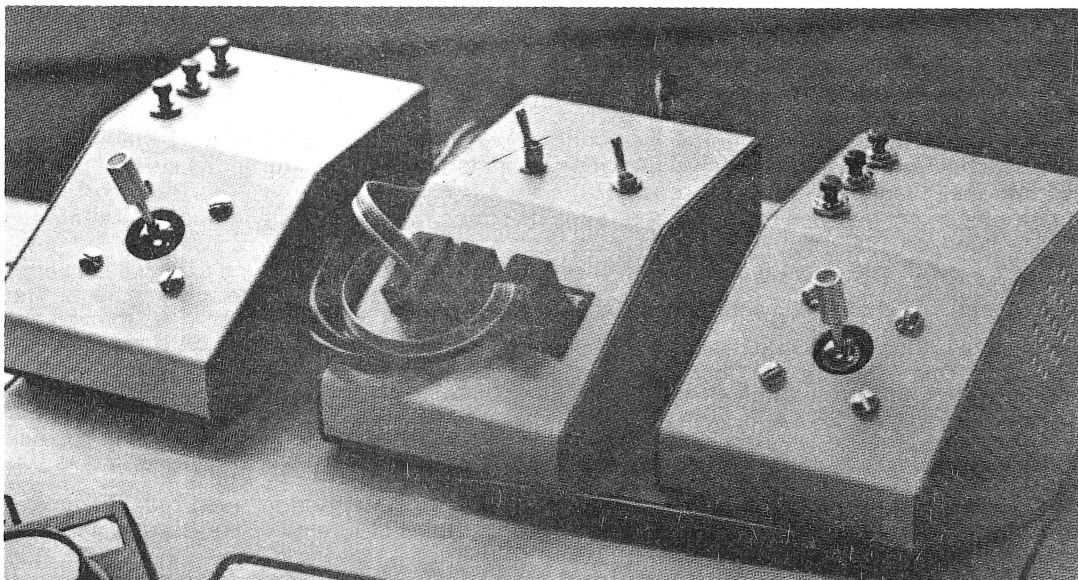
PROGRAMMA EXPANDA-PORT

The PROGRAMMA EXPANDA-PORT is a multi-port expander for the game I/0 port of any Apple II computer system. In addition to allowing expansion for up to six devices, the EXPANDA-PORT contains a built-in speaker that replaces the function of the Apple II's speaker. The switches on the EXPANDA-PORT allow for the selection of the specific device desired and for the switching of that device. No unplugging of any device connected to the EXPANDA-PORT is required. The PROGRAMMA EXPANDA-PORT comes completely assembled and tested, including a User's guide.

The PROGRAMMA JOYSTICK and EXPANDA-PORT are available on a limited basis through your local computer dealer. Apple II is a registered trademark of Apple Computers, Inc.

PROGRAMMA INTERNATIONAL, INC.   **$49.95**
3400 Wilshire Boulevard
Los Angeles, California 90010
(213) 384-0579 • 384-1116 • 384-1117

LIGHT PEN

A self-contained light pen which plugs directly into the Apple has been announced by the 3-G Company. The 3-G Light Pen makes it possible to bypass the Apple's keyboard and interact directly with the information displayed on the CRT screen. A "menu" can be displayed on the screen and the user can make a selection from that menu by using the light pen. The Light Pen is completely assembled and ready to plug into the Apple game paddle port. A demonstration game cassette, sample program and complete programming instructions are included with the pen.

3G COMPANY, INCORPORATED $32.95
Route 3, Box 28A
Gaston, Oregon 97119
(503) 662-4492

INTROL HOME CONTROL SYSTEM

Introl Remote Control Systems let you extend the reach of your computer to monitor and control AC devices remotely. Turn on the lights. Turn them off. Turn on the stereo or TV. Sprinkle the lawn. Turn on the security system automatically when you're gone. And find out whether all your instructions got through loud and clear in the monitor mode.

Introl operates over your existing AC wiring. That means any AC socket can be a control point. No additional wiring needed to string to remote locations

HOW IT WORKS

Just about any AC device can be turned on and off by computer commands which flow along the house or building's existing AC wiring. The Introl System consists of an AC Controller which transmits commands over the AC wiring and Dual Channel AC Remote boxes which receive and execute commands. The AC Controller board plugs into the computer bus and connects to existing AC wiring through an AC Interface Adapter—which comes off the board and plugs into any convenient AC socket. The AC Controller then impresses a code-modulated 50 KHz signal on the AC wiring and transmits it to any operative remote.

Up to 32 Dual Channel AC Remote boxes may be plugged into any sockets in the wiring system where you seek control. One or two AC devices may be plugged into each Dual Channel AC Remote box. Thus, you can control and monitor up to 64 separate happenings with one AC Controller board.

Each channel in every AC Remote box continuously monitors the code-modulated signal from the AC Controller. When it receives a code corresponding to its address, it executes the command that follows—turning power on or off to whatever AC device is plugged into that channel.

Further, the Controller can poll any channel and determine its status. Send a command and determine its status. Send a command to turn a lamp on and receive a report back that the command was received and executed. Bidirectioal communication provides error-free operation so you're never in doubt.

SIMPLE TO INSTALL AND USE

Introl is simple to install. Plug the AC Controller into a computer bus, connect the AC Interface Adapter to the Controller and the AC power line. This connects the Controller to the AC wiring and completely isolates the Controller and your computer from the 110/220 volt power, while allowing the control signals to pass. Plug Dual Channel AC Remotes into AC sockets at points of control and you're ready to start programming your computer for control functions.

SOFTWARE

All the software sub-routines for most BASIC's are included. And they're written in clear, readily applicable form. That means you can write programs easily . . . and/off . . . poll and check status of a remote. For even easier programming, use Introl BASIC.

ADD A REAL-TIME CLOCK

Add Mountain Hardware's Apple Clock and program devices to go on and off at any time of the day or night, any day of the week or month . . . for years.

APPLICATIONS UNLIMITED

Program lights to go on and off while you are away on vacation, changing from one room to another in the course of every evening. Change the patterns from night to night.

The ability to monitor power usage throughout a home or building is a natural for this system. Your computer can shut down high energy users on a priority basis.

Monitor and control your solar heating system, programming for optimum energy utilization.

The best time to water the lawn happens to be 2:00 a.m., when most of us are sound asleep. Program your sprinklers to come on at this proper time and shut off after 15-20 minutes.

For the photographer, a fully automated darkroom can save time and energy, and provide precise and consistent results every time.

SPECIFICATIONS FOR AC CONTROLLER

• Control up to 64 independent channels remotely. (32 Dual Channel AC Remotes)
• Communicates up to ½ mile or to the local transformer.
• 50 KHz pulse coded modulation.
• Bidirectional system allows communication to and from each remote channel.
• Uses standard 8 bit UART data format.
• Every transmission is checked for parity, framing, overruns and address errors.
• Controller board occupies one I/O expansion slot on the Apple II or two ports of an S-100 system.

SPECIFICATIONS FOR DUAL CHANNEL AC REMOTE

- Operates on available AC voltage. Specify 110 or 220.
- Two independent 500 watt channels per remote unit.
- Unit is housed in an attractive walnut box.
- Manual override switch for each channel.
- Internal fuses provided for each load.
- Self-calibration circuit allows easy alignment to Controller.
- Address selection on-board via jumpers.

PRICES

Introl System for Apple II or S-100 computers. Consists of one AC Controller unit, AC Interface Adapter, calibration cable and one Dual-channel AC Remote Station including handsome walnut case, line cord, AC plugs and complete documentation. Additional Dual-channel AC Remotes are $99. For 220 V operation—inquire.

MOUNTAIN HARDWARE, INC.
300 Harvey West Boulevard
Santa Cruz, California 95060
(408) 429-8600

Fully assembled and tested $329.00

NUMERIC KEYPAD

California Micro Products announced a new product for the Apple II, the Multi-Function Numeric Keypad, Model KBAII. The unit combines ten numeric keys and eight function keys: right/left cursor, minus, escape, slash, space, return, and period. No modifications to the Apple II are required. Housed in a sloped-front enclosure with Apple II compatible color and texture, the keypad has a five-foot cable which allows positioning for operator convenience.

CALIFORNIA MICRO PRODUCTS $199.00
795 West Imperial Highway
Brea, California 92621
(714) 990-4014

VERSAWRITER

VersaWriter is a drawing tablet for the creation of full-color, high resolution graphic images on the Apple. Images may be drawn freehand or traced from existing images (cartoons, photos, drawings, etc.) using the simple pivoted two-arm pantograph with magnifying crosshairs. After an image is drawn, it may be rotated, shrunk, or enlarged. It may be moved across the screen and alternated with other images thus providing high-resolution animation. The image may be colored with varied colors.

Graphical images made with VersaWriter and stored on tape or disk may be called from other programs or even imbedded in them. With VersaWriter, you don't have to worry about assembly code, counting pixels or other cumbersome hi-res graphics entry and retrieval techniques. VersaWriter graphics can be used in all types of programs—games, statistics, engineering, artistic, and educational. Your only limit is your own imagination.

Disk 1 contains the basic plotting, scaling, movement, rotation, color, transfer and recall software. This disk also includes routines which create ''shape tables'' from your figures to be used in other programs. Disk 2 contains applications software. One program adds five sizes of upper and lower case text to drawings, another adds standard electronic and digital symbols, while a third calculates distances and areas.

VersaWriter requires a 32 or 48K disk system, Applesoft in ROM or an Apple II Plus.

PERIPHERALS PLUS   VersaWriter $252.00
16 Pine Street
Morristown, New Jersey 07960
(201) 540-1533

TAPE ACTIVATOR

The TAPE ACTIVATOR allows you to control an audio tape recorder directly from your Apple II computer. Start and stop commands are related from the computer to the tape recorder via the CANDEX PACIFIC TAPE ACTIVATOR.

The activator is connected to the tape recorder via the remote jack which receives the start/stop commands. It is also possible to control other devices remotely using the Candex Pacific Tape Activator so long as the activator current rating of 1/2 amp. is not exceeded.

The activator plugs into the game I/O connector on the Apple computer. Its connector allows another activator or the Apple game controls to plug into it so that multiple devices can be used simultaneously. There are four models of the Tape Activator. Each model is addressed selectively by different poke commands.

Note that if more than one activator is to be used with a single Apple computer, each activator must be a different model. Do not use more than one activator of the same computer.

Each activator comes complete and ready to use. An instruction sheet is included which contains a listing of software commands for controlling the activator.

CANDEX PACIFIC INC.   Model 100-00 $39.95
693 Veterans Boulevard   Model 100-01 $39.95
Redwood City, California 94063   Model 100-02 $39.95
(415) 364-8427   Model 100-03 $39.95

MULTI-FUNCTION NUMERIC KEYPAD

No modification to Apple II required. Compatible with Apple II expansion slots. Ten numeric keys (with double width 0). Eight function keys—right/left, cursor, minus, escape (ESC), slash (/), space, return. The IN#n command turns on the Numeric Keypad. Easy plug-in installation, no disassembly of Apple II, no Apple II components to remove. A five foot cable allows positioning for operator's convenience.

CENTURY ELECTRONICS $199.00
447 Associated Road
Post Office Box 429
Brea, California 92621
(714) 990-3051

DATA ENTRY PAD FOR APPLE II

This is the same KeyPad that Apple Computer displayed with their APPLE II business systems at the National Computer Conference in New York City. The KeyPad is engineered for use with the APPLE II or APPLE II PLUS computers and is designed to simplify tedious data entry tasks. It provides 13 keys (0-9, decimal point, minus sign and ENTER) and is easily attached to any APPLE II computer which it matches in color and form. Fingering and arm position is simplified by the low profile design which allows either hand-held or desk top use. The key switches are quality engineered for exceptional reliability and performance. (Uses Datanetic's DC-50 switches which are guaranteed for at least 100 million operations.)

The KeyPad is a cost effective tool for data entry tasks and makes an excellent addition to your APPLE II computer system.

FEATURES:
- Quality key switches
- Does not use I/O slot
- Rugged NOREL Case
- Standard Accounting layout
- Molded Cable

TYPICAL USES:
Accounting: Payroll, Inventory, Bookkeeping
Industrial Scientific: Estimating, Statistics
Educational: Classroom, Laboratory
Personal/Home: Finance, Games

KEYBOARD
Thirteen (13) numeric plus special function keys

ELECTRICAL
Contact Ratings (resistive load)
 Volt-amp range — 0.3 to 50 MVA
 Current Range — 0.3 to 10 MA
 Voltage Range — 0.5 to 30 VDC
 Contact Resistance — 0.200 ohm max.
 Contact Bounce — 2.0 MSec max.
 Insulation — 100 megohm min. at 100 VDC
 Capacitance — 10 pf max. at 1 k KHz

MECHANICAL
Contacts Gold-plated copper alloy
Pre-travel .110 +/-.015 inches
Total travel .180 +/-.010 inches
Release Point (above make point) .040 +/-.010 inches
Operating Life 100,000,000 key strokes

ENVIRONMENTAL
Operating Temperature +32° to 140° F
Storage Temperature -32° to +160° F
Relative Humidity 95% max (non-condensing)
Vibration 10-55hz at .06 Displacement

PHYSICAL
Weight less than 14 oz.
Height 1.5 inches
Length 6.3 inches
Width 3.4 inches

INSTALLATION
KeyPad furnished with 40 pin connector which installs under decoder IC on APPLE II keyboard sub-assembly.

ADVANCED BUSINESS TECHNOLOGY, INC. $125.00
12333 Saratoga-Sunnyvale Road
Saratoga, California 95070
(408) 446-2013

EXPANSION CHASSIS

Eight more slots for your Apple. Attractive sturdy enclosure. Its own heavy duty power supply. Easy to use. Address cards in Expansion Chassis the same way as in your Apple. Only one additional command to specify in Apple or in Expansion Chassis. Compatible with all Apple peripherals. Available July, 1980.

MOUNTAIN HARDWARE, INC.
300 Harvey West Boulevard
Santa Cruz, California 95060
(408) 429-8600

CAVRI

Computer Assisted Instruction (CAI) and Videotaped Teaching can now be easily combined to give all the didactic power of CAI integrated with complex, moving, colorful visual materials plus speech, music and sound effects. Using the recently announced CAVRI System, CAI may be inserted into any of the thousands of already existing videotapes, thereby finally breaking through the software bottleneck that has held back the full development of CAI for many years.

A segment of videotape on a topic is presented to a student. The computer is programmed to automatically pause the video player after the segment is finished and to switch control of the TV screen to the computer, which produces CAI text on the materials just presented. Only after the student has shown by responding correctly on the keyboard, that he/she understands the subject matter will the next segment of the videotaped instruction begin. Student responses can be scored, if so desired.

A package consisting of all the materials required to integrate an Apple II and any video player/recorder having remote pause capabilities and two audio channels is available from CAVRI (Computer Assisted Video Recorded Instruction) Systems. The package includes a computer/videotape interface, all necessary cables and connectors, an instructional manual, and a starter cassette containing a group of subroutines (taking up less than 1K of memory) that enable the teacher to write programs from CAVRI with consummate ease. For those who would prefer not to write their own programs, CAVRI provides a service that will write programs for a modest fee.

CAVRI SYSTEMS $390.00
26 Trumbull Street
New Haven, Connecticut 06511
(203) 562-9873

MICROVERTER MVX-500 VIDEO MODULATOR

Transform Apple II's video output to a video-modulated UHF signal. For black and white or color. Outputs a signal tunable to one of four channels above television channel 14. It does not require direct connection to your television receiver's antenna terminals. Powered by four AA cells. From dealers or factory direct.

ATV RESEARCH   Approximately $35.00
13th and Broadway
Dakota City, Nebraska 68731
(402) 987-3771

TEKSIM* the Apple II/Tektronix 4010 Simulator

A read-only memory (ROM) that enables your Apple II to be used as a computer graphics terminal when connected to a computer other than the Apple, i.e. a host computer. Using the high-resolution plotting capabilities of the Apple II, TEKSIM emulates Tektronix 4010-series terminals from the 4006 to the 4014. Characteristics of the 4006 and 4010 are precisely simulated. For the 4012 through the 4014 all features except lower case/variable size characters and enhanced graphics are emulated by TEKSIM. Since the graphical resolution of the Apple II is roughly ¼ of the Tektronix (280 x 192 vs. 1024 x 1024), TEKSIM can never produce an image as good as the Tektronix terminal. For most applications, however, image quality will be sufficient, especially when the cost advantage of the Apple-TEKSIM combination is considered.

In conjunction with the Apple, the basic features of TEKSIM allow you to:
    a) Display graphical output from a program residing on a host computer, without having to modify that program.
    b) Send graphical input to a host computer using game paddles or a joystick.
    c) Issue local commands for screen erasure, to return to the Apple monitor, and for sending a BREAK signal.
    d) Produce multicolored graphics displays by making only trivial changes to the host-resident program.

TEKSIM consists of a ROM chip and a special Apple adapter unit that must be plugged into socket D8 inside the Apple II.

ABW CORPORATION $795.00
Post Office Box M 1047
Ann Arbor, Michigan 48106
(313) 971-9364

DUST COVER

Especially designed for the APPLE II, the Computer Canopy dist covers are made of heavy duty upholstery grade, multiple-ply vinyl with cloth backing. All top seams are reinforced with cording for rigidity and strength. The Computer Canopy is offered in deep textured walnut and textured tan.

DIGITAL DYNAMICS   **$14.95 Postage Paid**
310C Breesport
San Antonio, Texas 78216
(512) 341-8782

CLEAR PLEXIGLAS COVER

See which slot each card is plugged into and show the insides of your APPLE II without constantly removing the cover. The slots in the back of the cover for the disk, paddle and modulator cables are enlarged for a better fit. These covers are 11-11/16'' wide and will not fit some older Apples. Check the width of your Apple before ordering. If not standard, include the correct width.

COMPUTER FORUM   **$25.00**
14052 East Firestone Boulevard
Santa Fe Springs, California 90670
(213) 921-2111   (714) 739-0711

RESET KEY PROTECTOR

Fast relief for the accidental reset blues! Prevents reset when reaching for = and return. Allows deliberate usage. Custom, precision molded part. Easily installed. Original equipment look.

PKC INC.
2003 Quail Street
Newport Beach, California 92660

$2.25

APPLE LOCKER

Apple Locker is your measure of prevention against theft. It is a security locking device designed to discourage any would-be thief from taking the entire computer, two disk drives, monitor and boards (or any combination of Apple and three devices). It comes complete with locks, connectors, cable and diagrams for installation (approximately 45 minutes).

TELE-TERMINALS, INC.
7216 Boone Avenue North
Brooklyn Park, Minnesota 55428
(612) 535-5330

$69.95

COMPUCOVER

Light weight, naugahyde vinyl. Available in three decorator colors: Electra Blue, Saddle Tan, and White Room White.

COMPU-COVER
Post Office Box 324
Mary Esther, Florida 32569
(904) 243-5793

(Keyboard only)	$ 9.96
DISK	3.95
APPLE SET	11.95

HEAD CLEANING DISKETTES

Uses a wet-and-dry method in which a cleaning solution is applied to the porous cleaning fabric in the diskette envelope. The cleaning diskette is then run in a normal manner for 30 seconds. Two-sided systems may be cleaned with the same technique.

Each kit comprises two diskettes and a bottle of fluid, quantities recommended for a maximum of 30 cleanings (15 per diskette.

3M DATA RECORDING PRODUCTS DIVISION
Box 33600
St. Paul, Minnesota 55133
(612) 733-9572

#7440 $30.00

LIGHTING AND TRANSIENT SUPPRESSOR

Does your computer sometimes cough, sneeze or have a seizure? It may be suffering from Transient Glitchitis, a cureable digestive disorder. The Blitz Bug can bring fast relief from these symptoms in less than 50 nano seconds. Available without prescription. Use only as directed. Blitz Bug protects your entire circuit, and plugs into any outlet.

The Blitz Bug is a fast-acting lightning and transient surge suppressor. As you may or may not be aware, the commercial A.C. power line is a carrier of transients, glitches and noise pulses. These high voltage short duration spikes can often be in excess of 1,000 volts. Constant bombardment of these high voltage spikes can substantially weaken electronic components, causing intermittent and erratic operation or catastrophic failure in semi-conductors.

The Blitz Bug is capable of clamping line surges to a safe level with a response time of less than 50 nano seconds. It will sustain up to 20 joles of current for a short period of time. Due to the fact that the Blitz Bug is in parallel with the A.C. power line, it offers protection to everything that is on the same parallel circuit and located in the same immediate area. When no voltage spikes are present, the Blitz Bug, for all practical purposes, appears as an open circuit. When a voltage surge, transient static electricity, or noise pulse exceeds the pre-set level of approximately 186 volts, the Blitz Bug conducts for the duration of the spike and clamps all voltage spikes to a safe level, thus preventing damage to electronic equipment. When more than one Blitz Bug is used on the same parallel circuit, the amount of protection increases proportional to the number of Blitz Bugs. The Blitz Bug should always be installed on the protected or fused side of the power line. A severe lightning strike or frequent and sustained transients can permanently damage the Blitz Bug, rendering it inoperative.

OMNI COMMUNICATION COMPANY, INC.
200 West County Line Road
R.D. 3, Box 200
Jackson, New Jersey 08527

$19.95

APPLE CART

The cart stores an Apple II, one or two disks drives and monitor and has additional shelf space for game paddles, manuals and other items. The stand is made of heavy duty metal painted a crinkle black. It has a concealed shelf to put manuals or other items for storage. Casters allow easy and versatile movement of the stand. Shelf may be detached if desired by two thumb screws.

TELE-TERMINALS, INC.
7216 Boone Avenue North
Brooklyn Park, Minnesota 55428
(612) 535-5330
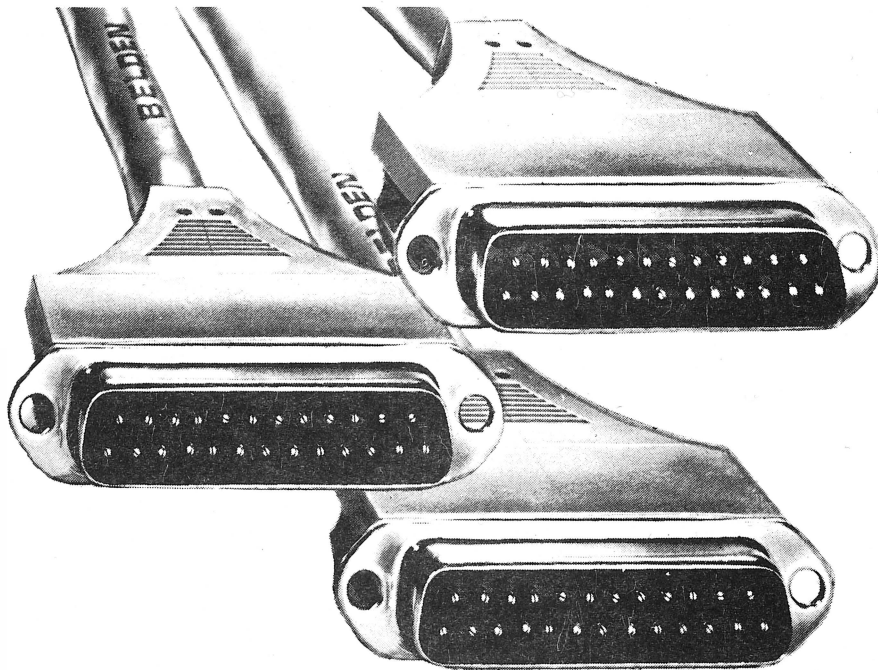
RS 232 CABLES
Both complete molded cable assemblies and cables with an RS-232 connector on just one end are available. 25 conductor cable assures you of complete connections for any applications. Lengths available are 10 foot and 25 foot.
WIDL VIDEO
5245 W Diversey
Chicago II 60639
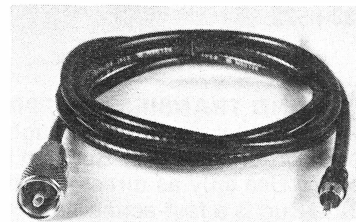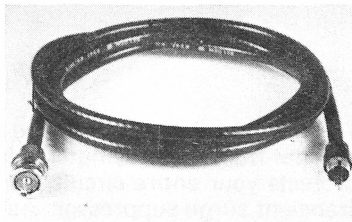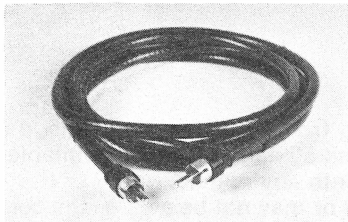
VIDEO INTERCONNECT CABLES
Stop using makeshift cables to interconnect the APPLE with televisions, monitors, and other equipment. We have the high quality molded VIDEO cables that will plug directly into your APPLE. The other end can be supplied with your choice of either phono connector, BNC connector, f connector, or UHF (PL-259) connector. These are high quality, hand wired cables that are well worth the investment. lengths of 3 foot, 6 foot, 12 foot, and 25 foot are available. Please contact us for special requirements or dealer pricing.
WIDL VIDEO
5245 W Diversey
Chicago II 60639

PORTABLE TERMINAL
Here is an item that is not exclusively for the APPLE. It can be used with any computer system, and is a peek at the future. It is a portable terminal that will allow you to access your APPLE from a variety of locations including a gas station, a pay phone, home, another office, or wherever. It has its own acoustic coupler and operates over any regular telephone line. It uses the standard RS-232 interface and is battery operated. LED display on this calculator shaped device shows 16 characters at a time and scroll a full 80 column line with its built in buffer.
NIXDORF
MARKLINE
PO Box 171
Belmont MA 02178

keyboard $139
computer module $195
coupler $175

CUSTOM FITTED FROSTED VINYL DUST COVER   **$6.95**
MICRO ACCESSORIES
Post Office Box 3271
Culver City, California 90230

CUSTOMIZED INTERCONNECT OF RS-232 INTERFACES

The Remark Model 54 Stunt Box allows the user to customize inter-connections between different RS-232 based devices. The Model 54 consists of a PC card containing two RS-232 connectors, one male and one female. Frame ground, pin 1, is permanently connected between connectors. Each of the remaining 24 connector pins from each connector is wired to a .025 inch square pin and a plated through hole. This arrangement allows the use of wire-wrap or jumper pins on the posts to interconnect the signal paths while components can be inserted in the signal path between connector pins by soldering in place in the plated PC holes.

REMARK INTERNATIONAL   **$52.00**
4 Sycamore Drive
Woodbury, New York 11797
(516) 367-3807

APPLE-LITE

A brand new gooseneck lamp that has been designed with the APPLE in mind. Finished in a durable black polyurethane finish, the APPLE-LITE features a bayonet type bulb, 360 degree swivel base, hi-lo-off switch, and a quick release connector for easy storage of the lamp when not in use, or when your APPLE is being moved. The base mounts easily to your APPLE without drilling any holes!

WIDL VIDEO   **$49.95**
5245 West Diversey
Chicago, Illinois 60639
(312) 622-9606

VINYL CARRYING CASE

Holds drive, interface card, disks, and manuals. Brown vinyl.

P.D.S. INC.   **Postage Paid $18.95**
Box 1446
Bloomington, Indiana 47401

COMPUTER FURNITURE

If you are tired of having your minicomputer sit on the edge of a card table, you may want to contact these people for a catalog. They manufacture a full line of computer furniture including terminal stands, desks, and desks with electronic enclosures.

COMPUTER FURNITURE AND ACCESSORIES
1441 West 132nd Street
Gardena California 90249
AC213 327-7710

THE CORVUS 11A DISK SYSTEM

The Corvus 11A is an intelligent peripheral that adds cost effective mass storage to the Apple Computer, while maintaining total compatability with existing hardware and software. The system package consists of the IMI 7710 ''Winchester'' disk drive with Corvus intelligent controller, a complete power supply, and an intelligent module for the Apple, consisting of an interface card and its associated software.

ULTRA COMPACT 10 MEGABYTE DISK DRIVE

The disk drive provides eleven million bytes of unformatted magnetic storage in less than two/thirds of a cubic foot of space. The unit features a closed loop servo. This assures accurate and rapid read/write head positioning independent of temperature and other environmental factors. There are three data surfaces and one servo surface on two 8'' platters.

The drive electronics are contained in three 7.5 inch by 10.5 inch printed circuit boards which are enclosed within the drive housing. This housing also contains a fourth PC card of the same dimensions which is the Corvus intelligent disk controller.

CORVUS INTELLIGENT CONTROLLER

This controller is based on the Z-80 processor with 16K of Random Access Memory. Firmware for this controller provides such features as:
- Sector Buffering
- Read and write
- Error recovery with automatic retries
- Error statistic monitoring and diagnosis
- Transparent formatting with CRC error detection
- High speed data transfer utilizing DMA

CORVUS/APPLE INTERFACE

The system interfaces to the Apple processor by means of a standard interface card which can be plugged into any of the processor's seven I/O slots. This interface and associated controller can support four disk drives in a simple daisy chain. To maintain total compatability with Apple DOS, the user is restricted to two drives. The interface card provides a buffered parallel I/O that is capable of transferring data at a rate of over 50 kilobytes/second. The system software is contained in a two-thousand byte ROM which adheres to all Apple standards for such a device.

CORVUS SOFTWARE

The system software resident in the ROM interfaces with the Disk II operating system to provide complete compatability with DOS commands and existing DOS applications. This is accomplished by maintaining 82 physical volumes on disk that are sector by sector compatible with Apple volumes. These volumes are all concurrently ''on-line,'' such that any application program can utilize the entire data base by simple use of standard DOS syntax.

A master file directory of all volumes is attainable by a simple ''CATALOG, V0.'' Execution of this command will present an output of the File Name of each volume. A volume may be ''hidden'' (or unlisted) and thus locked out, by simply locking that first File.

The software system features a bootstrap loader that transfers a complete memory image from disk to memory and then executes any Basic Program (either Integer or Applesoft) contained in that image. The generation of this memory image is a standard Corvus utility.

The system also contains copy utilities which can transfer an entire volume from any physical volume (be it hard disk or floppy) to any other physical volume. Additional utilities include complete disk backup to a second CORVUS 11A disk drive and a comprehensive self-diagnostic package which provides transient error statistics from the normal disk drive operation.

PERFORMANCE SUMMARY

Size of Drive	5.5 x 8.5 x 19.25 inches
Size of Power Supply	5.5 x 4.5. x 15.5 inches
Power Consumption	250 watts
Weight of Drive	22 lbs.
Weight of Power Supply	13 lbs.
Formatted Data Capacity	9.5 Megabytes
Minimum Seek Time	10 milliseconds
Average Seek Time	50 milliseconds
Average Latency	8.3 milliseconds

CORVUS SYSTEMS, INC.
Post Office Box 1590
Cupertino, California 95014
(408) 725-0920

MTI APPLE 8'' DISK SYSTEM
• One SA800R Floppy • Two Drive Chassis and Power Supply • Controller, Cable and DOS •

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WIZARD DISTRIBUTORS: "WIZARD 1 + 1" : single 8'' drive system; 256K $1695.00
  COMPUTER DISTRIBUTORS, INC.   "WIZARD 2 + 2" : two 8'' drive system; 516K   2495.00
  Post Office Box 9194   "WIZARD PLUS" : two 8'' drives, double sided; over 1 megabyte   3150.00
  Austin, Texas 78766   "WIZARD 10" [10 megabyte Winchester drive, formatted as one file   4975.00
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(800) 227-8266 (Outside California)

DISK II FLOPPY DISK SUBSYSTEM

Many computer applications depend upon rapid access to information. The home computer balancing a checkbook and the business computer managing inventory share this need. To provide for fast, low-cost data retrieval, Apple Computer, Inc. has developed Disk II.

Disk II simplifies the approach to your program library. No longer must you search through stacks of cassettes, or slowly read yards of tape to find the program you want. Now with a few keystrokes, your system will find and load any file by name. And it will do it quickly and reliably.

Disk II gives your system immediate access to large bodies of data. That makes inventory, address file, and recipe programs suddenly feasible. It means you can store a year's worth of financial records in one place, and sort through them quickly. And it allows you to handle many other applications that just were not practical before.

The Disk II Floppy Disk Subsystem consists of an intelligent interface card, a powerful Disk Operating System (DOS), and one or two mini-floppy drives. (The computer will handle up to seven interface cards and 14 drives, for control of nearly 1.6 megabytes of data). The combination of ROM-based bootstrap loader and an operating system in RAM provides complete disk handling capability.

- Powerful Disk Operating Software:
  - LOAD and STORE files by name (Up to 35 Char/Name)
  - BASIC Program Chaining
  - Random or Sequential File Access
- Fast Access Time — 600msec (Max.) Across 35 Tracks
- Individual File Write-Protection
- Full Disk Capability in Systems with as Little as 16K RAM
- Data Transfer Rate of 156K Bits/sec
- Storage Capacity of 116 Kilobytes/Diskette
- High-Efficiency Subsystem Powered Directly from the APPLE II (Up to 14 Drives)
- Completely Assembled and Tested — Not a Kit
- Packaged in Heavy-Duty, Color-Coordinated Steel Cabinet

The Disk II Subsystem allows your APPLE to manipulate program and data files through simple BASIC statements. Command interpretation and file handling are controlled by software automatically loaded into RAM as the disk is initialized.

A BASIC statement such as PR#7 activates the Disk Subsystem. The CATALOG statement will then display a list of the files contained on a particular diskette. Other commands allow the user to Write-Protect a file, READ or WRITE it, and SAVE it back on the disk.

As data is stored on the subsystem, it is automatically put into unused sectors of the disk, which are linked together until a space of adequate size has been created to hold the new file. Thus the user gets the most efficient utilization of his disk area, yet does not have to know the maximum size of each file in advance.

Files stored on the disk can be copied, deleted, or renamed under program control. Volume numbers assigned to individual files or to diskettes allow the handling of successive files of the same name. And the CHAIN command permits the chaining together of multiple BASIC programs.

The Disk II Operating System fully supports both ROM Applesoft and Apple Integer BASIC through its universal command handler. All commands are completely explained in the manual supplied with Disk II.

PARAMETER	DESCRIPTION
Commands:	OPEN, CLOSE, READ, WRITE, LOAD, SAVE, EXEC, RUN, APPEND, LOCK, CHAIN, UNLOCK, DELETE, MONITOR, NOMONITOR, MAXFILES, IN#, PR#, INIT, BLOAD, BSAVE
Access Method:	Random or Sequential — arbitrary record length
Bootstrap Loader Method:	By means of Loader routine in two 256 x 8 PROMs, on-card
Disk Drive:	Shugart 5¼'' floppy disk
Track Access Time:	Varies with number of tracks crossed. 200msec (avg.), 600msec (max. across 35 tracks)
Disk Speed and Latency:	300 rpm, 100 msec. avg. latency
Disk Capacity:	116K bytes (formatted), soft-sectored
Data Transfer Rate:	156K bits per second
Physical Dimensions:	Card—4.5'' x 2.75'' (not including connector fingers): fits inside the APPLE II Drive—6.1'' x 8.75'' x 3.8'' (WDH)
Controller Capacity:	Up to two drives per controller. Multiple controllers can be used

Order Number: A2M0004. Supplied with:
- Floppy Disk Interface Card
- Bootstrap in ROM
- Disk Drive and Connecting Cable
- System Software on Diskette
- Manual
- Blank Diskette

Order Number: A2M0003. Supplied with:
- Second Disk Drive and Connecting Cable

APPLE COMPUTER INC.
10260 Bandley Drive
Cupertino, California 95014
(408) 996-1010

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An independent corporation with non-profit status designed to support the development of new learning methods through small computers.
   Grants for equipment are available by application to the foundation. An education program information center is being developed to support educational programming.
APPLE EDUCATION FOUNDATION
20605 Lazaneo Drive
Cupertino, California 95014

INTERNATIONAL APPLE CORPS
Altho this group may have been listed under clubs, the International Apple Corps is much more than just a club. It is a **non-profit** organization formed in October 1979 to disseminate all forms of information, both hardware and software, from Apple clubs and users, computer related industry, and the Apple Computer Corp. IAC has produced the APPLE orchard magazine and has established a network of regional directors that will work closely with the local clubs.
INTERNATIONAL APPLE CORPS
PO BOX 976
Daly City California 94017

APPLE EXTENDED WARRANTY

To avoid maintenance costs, APPLE has introduced the extended warranty that covers all your APPLE manufactured products, **including** those purchased during the extended warranty period. If your APPLE is out of its initial 90 day warranty, you will need to take it to a dealer for an owner-paid inspection before the warranty is issued.

Contact your local APPLE dealer for costs and further information.

APPLE COMPUTER COMPANY
10260 Bandley Drive
Cupertino, California 95014

6500 uP PROGRAMMING MANUAL
This manual addresses the internal structure and assembly languag programming of the 6502 microprocessor. It assumes that the reader is moderately familiar with computer concepts.
   (Order No. A20003, 239 pages)
APPLE COMPUTER INC.
10260 Bandley Drive
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(408) 996-1010

6500 uP HARDWARE MANUAL
This manual is directed at the hardware designer who wants detailed information about the 6502 microprocessor used in the APPLE II.
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APPLE COMPUTER INC.
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APPLESOFT REFERENCE MANUAL
This manual introduces Applesoft: an extended BASIC language for business and scientific applications. It is written for the user who has some familiarity with the BASIC language.
   (Order No. A2L0004, 75 pages. Supplied with systems using 16K or more RAM)
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APPLE II BASIC PROGRAMMING MANUAL
This manual starts from the beginning with how to plug in the Apple. It then guides the user's first programming efforts. A humorous style and abundant examples make this the ideal textbook for newcomers to personal computing.

(Order No. A2L0005, 125 pages. Supplied with Apple systems)
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APPLE II REFERENCE MANUAL
This manual addresses the details of the system: hardware schematics, firmware listings, special system features, and use of the monitor. It is aimed at the user who is comfortable with BASIC and wishes to become familiar with the advanced features of the APPLE II.
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The APPLE II is used for the programming examples in this book. Video graphics on it is accomplished with simple instructions that are part of the BASIC language. Statements are used to control certain graphics commands, such as PLOT X,Y or COLOR= or HLIN. Because the graphics commands are simple, no prior programming experience is needed to use them. The book follows a simple format that introduces the major graphics instructions available on the computer, and then shows how they work and what they can be used for in a program. Numerous photographs are provided to help you visualize how the instruction operates.

The sections in the book include: what a graphics computer is; scanning; character generator ROM; color graphics; display density; language statements; product profiles; digitizing tables; drawing simple pictures; backgrounds; and animation.

Howard W Sams and Co Inc 12.95
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Indianapolis Indiana 46268

HOW TO PROGRAM MICROCOMPUTERS

By Willaim Barden Jr. A guide to assembly language programming of the 8080, 6800, and 6502 microproccesers. Written especially for beginning programmers with hobbyist microcomputers based upon one of thes three chips.
256 pages 5.5 by 8.5 Softbound. Order number 21459

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6502 SOFTWARE DESIGN

Written especially for the 6502 chip, the heart of the Apple computer. This book will help you program in assembly language. The basis of the book is the Rockwell INTERNATIONAL AIM-65 but the programs can be used with any 6502 based machine. Some minor alterations might be necessary to reflect the memory and I/O devices on the APPLE. 288 pages. Written by Leo J. Scanlon. This is a new publication for 1980

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Written by Jim Poirot and Don Retzlaff. 136 Pages paperback. Designed to be used while you actually have your ''hands on'' the microcomputer. Courseware and software loaded into the computer parallels chapters in the workbook. Students do not need to have any programming background, the workbooks and courseware give students the capability of learning the BASIC programming language in a microcomputer assisted instructional mode. The workbooks are useful as reinforcement as students progress thru the programs. Questions are included to stimulate student interaction with the microcomputer and test the students progress through the programs. Questions are included to stimulate student interaction with the microcomputer and test the students understanding of the BASIC programming language. Also, questions of a ''what if'' content are included to generate student interaction.
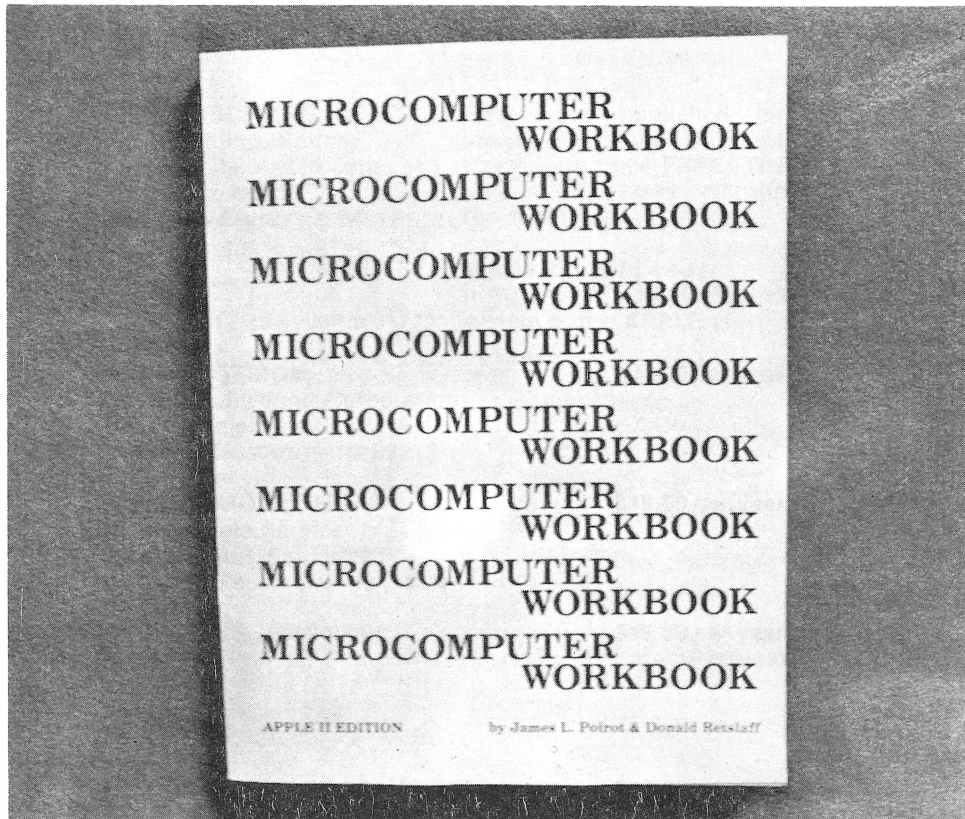
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APPLE ORCHARD
Val J. Golding, Editor
International Apple Corps
Post Office Box 976
Daly City, California 94017

First issue published for introduction at the 1980 West Coast Computer Faire. The official publication of the International Apple Corps.

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DANDELION REPORT   **Subscription rates not available.** First publica-
James D. Dwyer, Editor   tion — July/September,
P.O. Box 615   1980. Volume One will
Mt. Vernon, Illinois 62864   target **Apple** computer
(618) 244-2608   users in particular.

CONTACT   Published & distributed
User Group Newsletter   at no charge to those
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Cupertino, California 95014   ranty cards. Issues are not
(408) 996-1010   on a regular basis, but
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THE CIDER PRESS
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    THE CIDER PRESS is the official publication provided to the membership February through June, and September through December. Included are program listings, tips, special features, reviews, editorial comment . . . The "Best of the Cider Press" is published every January. "Apple Peelings" takes over in July and August with an abbreviated format consisting of minutes of meetings, Disk of the Month listing, product information and any News Flashes.

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APPLESAUCE   Club newsletter of the
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Moore's Audio-Visual Center
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THE APPLE II FOR THE ARAB WORLD

Features: • Dual English—Arabic Monitor
• Dual English—Arabic Character Generator
• English—Arabic Text Selection
• Double Set of Applesoft Firmware
• Bi-Lingual English—Arabic Keyboard
• English—Arabic Commands

Bi-Lingual Application Programs Available

The ARAPPLE microcomputer is the Arabic development of the Apple II. It has two additional elements:
— The Arabsoft firmware card (which is found in slot # 0 of the system), the Arabic monitor, the Arabic BASIC interpreter and a red switch on the rear side of the computer for the selection of the Arabic mode (up position) or English mode (down position).
— The Arabic character generator which is found on the Apple motherboard.

Arabsoft BASIC is the Arabic, floating point BASIC interpreter that works with the ARAPPLE computer. The difference between Arabsoft and Applesoft BASIC is as follows:
a) All the operating commands (LOAD, RUN, TRACE, NOTRACE, CONT) are translated into Arabic.
b) All the error messages (e.g. SYNTAX ERROR, NEXT WITHOUT FOR, BAD SUBSCRIPT, . . .) are translated into Arabic.
c) Numbers are input right to left. For example, 351 is entered by typing 1, following by 5, followed by 3.
d) All the other Applesoft BASIC commands are kept the same.
In other words, if you would like to write Arabic programs, you have to write them in English Applesoft first, and then completely run and/or debug them in Arabic.
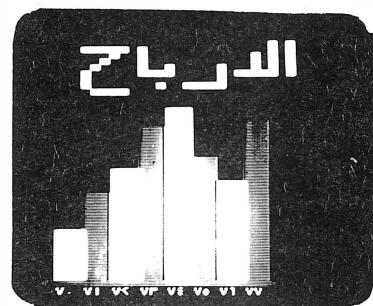
The ARAPPLE microcomputer has two modes of operation, the English mode and the Arabic mode.

Your system operates in the **English** mode if the red switch of the Arabsoft card is in the "down" position. Now the cursor appears on the left side of the screen and moves to the right whenever you type any character, which will be displayed as an English character.

Your system operates in the **Arabic** mode if the red switch is in the "up" position. Now the cursor appears on the right side of the screen and moves to the left whenever you type any character which, in turn, will be displayed as an Arabic character.

To switch from one mode to the other, press RESET, flip the red switch and press RESET once more.

Note: In the Arabic language, some letters take different shapes depending on their position in the word. ARAPPLE takes care of that. There is only one key for each letter and the computer will figure out the proper shape.

To program ARAPPLE, your system has to be in the English mode, Applesoft BASIC, first. Write all your programs in English, the same way you write Applesoft BASIC programs. If you would like to display any Arabic message (e.g. in PRINT or INPUT statements), you have to press the corresponding keys (as found on the bilingual ARAPPLE keyboard).

To run your finished program in Arabic, press the RESET key, flip the red switch into the "up" position (Arabic mode), press RESET, (CONTROL) C, RETURN and type % T I and RETURN to run the program.

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(408) 727-1733

ARABIC APPLE II, 16KRAM $2,850.00
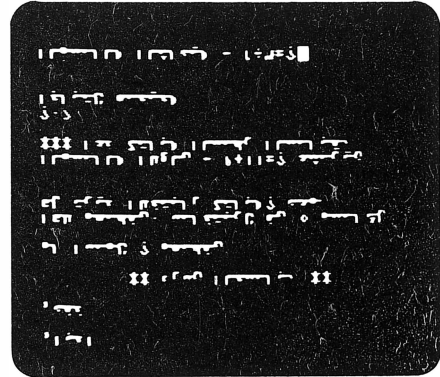
EUROMOD
This is the European version of the APPLE II designed for 220 volts AC operation, 50/60 Hertz and has a CCIR (625 line) video output, compatible with European television systems.

EURAPPLE		Model Number
10260 Bandley Drive	16K	A2S0016P
Cupertino, California 95014	32K	A2S0032P
(408) 996-1010	48K	A2S0048P

EUROPLUS
The European version of the APPLE PLUS featuring APPLESOFT BASIC. Arranged for 220 volts AC operation 50/60 Hertz and CCIR (625 line) video.

EURAPPLE		Model Number
10260 Bandley Drive	16K	A2S1016P
Cupertino, California 95014	32K	A2S1032P
(408) 996-1010	48K	A2S1048P

Time Sharing Systems

THE SOURCE
An information utility accessed from your Apple using a modem and a local telephone number. Non-prime time (after 6:00 p.m.) rates are currently $2.75 per hour, and allow you to access a multitude of subjects and information, including UPI needs.

Other subjects include:

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Compuserve, a Columbus, Ohio computer service organization which services more than 650 commercial customers, including government agencies, financial institutions, and large corporations, has recently expanded its services to encompass the personal computer set. MicroNET is a computer timesharing and software distribution service for home and small business applications. The service costs $5 per connect hour. The MicroNET system may be accessed via telephone service in 25 major metropolitan areas. It is available between the hours of 6:00 p.m. and 5:00 a.m. on weekdays, as well as all day Saturday, Sunday, and holidays.

According to the company, the personal computer owner will be able to use a variety of computer programs on a timesharing basis; communicate with other MicroNET customers; buy and sell software through the network; and obtain additional on-line storage. The MicroNET timesharing library includes a large selection of programs, educational aids, business applications, game and simulations, programming languages, and programming and diagnostic tools. Most of the programs in the MicroNET library are available at no charge other than the basic connect time rate.

All connect time charges and software purchases will be billed through use of credit card information which is provided by the customer.

PERSONAL COMPUTING DIVISION
COMPUSERVE, INC.
5000 Arlington Centre Boulevard
Columbus, Ohio 43220
(614) 457-8600

APPLE User Groups & Clubs

APPLE CLUBS AND USER GROUPS

The following organizations vary from just a few people trying to get a group going, all the way up to the well established clubs that have hundreds of members and an active schedule. In most cases, we have provided the name of a contact person. We do not show meeting schedules or locations, as they change frequently. Write the groups and ask for further information. And last but not least, this list is very perishable, so a group may not be there when you try to find it. Corrections and additions are welcome for the next edition—address them to **User Group Update, WIDL Video**, 5245 West Diversey, Chicago, Illinois 60639

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Microcomputer Systems
55 South Kukui-C109
Honolulu 96813
(808) 536-5288

IDAHO

Northwest Computer Center
6457 Fairview Avenue
Boise 83704
(208) 375-6681

R & L Data
684 Shoupe Avenue
Idaho Falls 83401
(208) 529-3785

Computer Concepts Inc.
990 Yellowstone/Alameda
Pocatello 83201
(208) 233-1401

ILLINOIS

Computerland
50 East Rand Road
Arlington Heights 60004
(312) 255-6488

Farnsworth Computer Center
1891 North Farnsworth
Aurora 60505
(312) 851-3888

Kappel's Computer Store
125 East Main
Belleville 62233
(618) 277-2354

Dow Com Inc.
601 West Industrial Park Road
Carbondale 62901
(618) 529-1033

Byte Shop
1602 South Neil Street
Champaign 61820
(217) 352-2323

Erickson Communications
5456 North Milwaukee Avenue
Chicago 60646
(312) 631-5181

Personal Computers of Chicago
100 East Ohio Street
Chicago 60611
(312) 337-6744

Apple Tree Stereo
1022 West Lincoln Highway
De Kalb 60115
(815) 758-2442

Main Street Computer Company
215 North Main
Decatur 62523
(217) 429-5505

Team Electronics Number 079
Northgate Mall Shopping Center
Decatur 62526
(217) 877-2774

Video Etc.
416 Lake Cook Road
Deerfield 60015
(312) 498-9669

Computerland
136 West Ogden Avenue
Downers Grove 60515
(312) 964-7762

Nabih's Inc.
519 Davis Street
Evanston 60201
(312) 869-6140

Midwest Photo SVC
158 North Broad Street
Galesburg 61401
(309) 342-6149

Team Electronics Number 141
1150 West Carl Sandburg Drive
Galesburg 61401
(309) 344-1300

Micro Computer Center
726 East State
Geneva 60134
(312) 232-1545

Computer Station Inc.
12 Crossroads Plaza
Granite City 62040
(618) 452-1860

Byte Shop
5 South La Grange Road
La Grange 60525
(312) 579-0920

Midwest Microcomputers
708 South Main
Lombard 60148
(312) 495-9889

Compu Shop
5920 West Dempster Street
Morton Grove 60053
(312) 967-0450

Computerland/Mundelin
1500 South Lake Street
Mundelin 60060
(312) 949-1300

Illini Microcomputers
612 East Ogden
Naperville 60540
(312) 420-8813

Computerland
9511 North Milwaukee Avenue
Niles 60648
(312) 967-1714

Apple Tree Stereo
117 East Beaufort
Normal 61761
(309) 452-4215

Electronic Business Machines
1200 Harger Road
Oak Brook 60521
(312) 654-0060

Computerland
10935 South Cicero Avenue
Oak Lawn 60453
(312) 422-8080

Bies The Computer Shop
7037 West North Avenue
Oak Park 60302
(312) 386-3323

Computerland
4507 North Sterling
Peoria 61614
(309) 688-6252

Computerland/Peoria
4507 North Sterling
Peoria 61614
(309) 688-6252

Wallace Electronics Inc.
4921 North Sheridan Road
Peoria 61614
(309) 692-2616

Shop Controls Inc.
2505 West 147th
Posen 60469
(312) 288-2001

Computer Store of Rockford
2320 North Central Avenue
Rockford 61103
(815) 962-7580

High Technology/Chicago
9801 Higgins Road Number 220
Rosemont 60018
(312) 823-7070

Data Domain
1612 East Algonquin Road
Schaumburg 60195
(312) 397-8700

Instant Replay
215 South Lewis
Springfield 62704
(217) 753-0426

Team Electronics Number 071
2716 South MacArthur Boulevard
Springfield 62704
(217) 525-8637

Computer Core
2477 Washington Road
Washington 61571

INDIANA

Stereo and CB City
132 East Main Street
Bloomfield 47424
(812) 384-4479

Data Domain
221 West Dodds Street
Bloomington 47401
(800) 822-4794

Data Domain
2805 East State Boulevard
Fort Wayne 46805
(219) 484-7611

Fort Wayne Electronics
3606 East Maumee Avenue
Fort Wayne 46803
(219) 423-3433

Computerland
9423 North Meridian
Indianapolis 46260
(317) 848-2546

Graham Electronics
6101 North Keystone
Indianapolis 46220
(317) 253-4261

Graham Electronics Supply
133 South Pennsylvania
Indianapolis 46204
(317) 634-8202

Home Computer Center
2115 East 62nd Street
Indianapolis 46220
(317) 251-6800

Digital Technology
10 North 3rd Street
Lafayette 47901
(317) 423-2548

Computerland
19 West 80th Place
Merrillville 46410

Graham Electronics
222 North Madison
Muncie 47306
(317) 288-8837

Meade Electric
921-C Ridge Road
Munster 46321
(219) 731-7100

IOWA

Cyberia
2330 Lincoln Way
Ames 50010
(515) 292-7634

Team Electronics Number 036
4444 1st Avenue Northeast
Cedar Rapids 52402
(319) 393-8956

Cinarco/Foley A V
219 Brady Street
Davenport 52801
(319) 324-0639

Memory Bank Inc.
4128 Brady Street
Davenport 52806
(319) 386-3330

Team Electronics Number 113
320 Kimberly Road
Davenport 52806
(319) 386-2588

Omni Computer & Electronics Center
4347 Merle Hay Road
Des Moines 50311
(515) 276-8858

Synchronized Systems Inc.
3711 Douglas Avenue, P.O.B. 1111
Des Moines 50310
(515) 279-8861

Team Electronics Number 007
2300 Kennedy Road
Dubuque 52001
(319) 583-9195

Team Electronics Number 093
Mall Shopping Center
Iowa City 52240
(319) 338-3681

Lyon Company Inc.
116 East State Street
Jefferson City 50129
(515) 386-4276

Central Iowa Business Machine
1450 North Federal
Mason City 50401
(515) 423-2586

Team Electronics Number 009
415 Pavonia Street
Sioux City 51101
(712) 252-4507

Team Electronics Number 139
2001 Leech Avenue
Sioux City 51107
(712) 277-2019

Computer Center
302 Commercial Street
Waterloo 50701
(319) 232-9504

Team Electronics Number 020
2750 University Avenue
Waterloo 50701
(319) 235-6507

KANSAS

Computer Video Room
7105 105th Street
Overland Park 66212
(913) 648-7104

Computerland
10049 Sante Fe Drive
Overland Park 66212
(913) 492-8882

Personal Computer Center
3819 West 95th Street
Overland Park 66206
(913) 649-5942

Barney and Associates
425 North Broadway
Pittsburgh 66762
(316) 231-1970

High Tech (Retail)
1036 West Pawnee
Wichita 67213
(316) 942-9695

Team Electronics Number 048
791 North West Street
Wichita 67293
(316) 942-1415

KENTUCKY

Sound Impulse Inc.
910 Bellefonte Road
Flatwoods 41139
(606) 836-3161

Data Domain
506½ Euclid Avenue
Lexington 40220
(606) 233-3346

Computerland
813 Lyndon Lane Number B
Louisville 40222
(502) 425-8308

LOUISIANA

Delta Micro Computer
104 Constitution Boulevard No. A
Alexandria 71301
(318) 442-0217

Computer Place, The
3340 Highland Road
Baton Rouge 70802
(504) 388-7693

Computer Place, The
1904 Pinhook Road
Lafayette 70508

Computer Shoppe Inc.
3225 Danny Park
Metairie 70002
(504) 454-6600

Micro Computers of New Orleans
2025 Canal Street
New Orleans 71812
(504) 821-0870

Micro Business Systems
3823 Gilbert
Shreveport 71104
(318) 869-3027

MAINE

Harper Electronics
114-2 South Commercial Street
Portland 04101
(207) 772-1156

MARYLAND

Computer Center of Columbia
9143G Red Branch Road
Columbia 21045
(301) 730-5186

Frederick Computer Products
Frederick Municipal Airport
Frederick 21701
(301) 694-8884

Custom Computing
806 Frederick Street
Hagerstown 21740
(301) 339-6500

Your Own Computer Ltd.
10678 Campus Way South
Largo 20870
(301) 350-6680

The Comm Center
9624 Fort Meade Road
Laurel 20810
(301) 953-9535

The Computer Workshop
1776 Plaza—1776 East Jeffer
Rockville 20852
(301) 468-0455

Computerland
16065 Frederick Road (Route 3)
Rockville 20855
(301) 948-7676

Computers Etc.
13A Allegheny Avenue
Towson 21204
(301) 296-0520

Computers Unlimited Inc.
907 York Road
Towson 21204
(301) 321-1553

MASSACHUSETTS

Lebow Labs Inc.
424 Cambridge Street
Allston 02134
(617) 782-0600

Ferranti-Dege Inc.
455 Brookline Avenue
Boston 02115
(617) 661-7650

Computer Store Inc.
120 Cambridge
Burlington 01803
(617) 272-8770

Computer Store Inc.
1689 Massachusetts Avenue
Cambridge 02138
(617) 354-4599

Harvard Cooperative Society
1400 Massachusetts Avenue
Cambridge 02138
(617) 492-1000

Tech-Coop/MIT Student Center
84 Massachusetts Avenue
Cambridge 02138
(617) 492-1060

Computer City
5 Dexter Row
Charleston 02129
(617) 242-3350

Sound Co., The
Fairfield Plaza
Chicopee 01020
(412) 593-5330

Computer Store, The
Route 9 Deerskin Plaza
Framingham 01701
(617) 879-3720

Two-Way Radio Service
358 Main Street
Hyannis 02601
(617) 775-8176

Component Systems
46 Mechanic Street
Leominster 01453
(617) 534-5124

Retail Computer Center
455 Center Street
Ludlow 01056
(413) 788-3900

Computer Source
26 Dunham Mall
Pittsfield 01201
(413) 443-7181

Sound Co., The
447 Sumner Avenue
Springfield 01180
(413) 736-3626

Computer Packages Unlimited
244 West Boylston Street
West Boylston 01583
(617) 829-2570

Computerland/Boston
214 Worcester Street
Wellesley 02181
(617) 235-6252

Computer Place, The
11 Harvard Street
Worcester 01608
(617) 799-4181

MICHIGAN

Newman Computer Exchange
1250 North Main Street
Ann Arbor 48104
(313) 994-3200

Computer Connection
38437 Grand River
Farmington Hills 48024
(313) 477-4470

Computer Center
28251 Ford Road
Garden City 48135
(313) 422-2570

Computer House Division/FLC Inc.
1407 Clinton Road
Jackson 49202
(517) 782-2132

Computerland/Grand Rapids
2927 28th Street Southeast
Kentwood 49508
(616) 942-2931

Team Electronics Number 029
P. O. Box 232, M & M Plaza
Menominee 49858
(906) 863-7878

Computerland
301 South Livernois Avenue
Rochester 48063
(313) 652-9000

Computer Mart
560 West 14 Mile Road
Royal Oak 48017
(313) 288-0040

Computer Mart
3145 Shattuck Road
Saginaw 48603
(517) 790-1360

Computerland
29673 Northwestern Highway
Southfield 48034
(313) 356-8111

Team Electronics Number 159
1180 South Airport Road West
Traverse City 49684
(616) 946-8326

MINNESOTA

Team Electronics Number 147
207 Third Street
Bemidji 56601
(218) 751-7880

Let 3 Inc.
Highway 218S and Main Street
Blooming Prairie 59917
(507) 583-2494

Computerland
8070 Morgan Circle Drive
Bloomington 55431
(612) 884-1474

Zim Computers
5717 Xerxes Avenue North
Brooklyn Center 55429
Digital Den
2138 Burnsville Center
Burnsville 55337
(612) 435-5445

Compudata Corporation
104 West Superior
Duluth 55802
(218) 722-6319

Team Electronics Number 165
504 East 4th Street
Duluth 55805
(218) 727-4900

Audio King
7101 France Avenue South
Edina 55435
(612) 920-4272

Team Electronics Number 095
204 Southdale Center
Edina 55435
(612) 920-4817

Team Electronics Number 163
Westridge Mall
Fergus Falls 56357
(218) 739-4443

Computerland
11319 Highway 7
Hopkins 55343
(612) 933-8822

Team Electronics Number 023
Madison East
Mankato 56001
(507) 387-7937

Team Electronics Number 044
3000 White Bear Avenue
Maplewood 55109
(612) 777-3737

Personal Business Systems
4306 Upton Avenue South
Minneapolis 55410
(612) 929-4120

Team Electronics Number 001
2640 Hennepin Avenue South
Minneapolis 55408
(612) 377-9840

Team Electronics Number 050
1311 4th Street Southeast
Minneapolis 55414
(612) 378-1185

Team Electronics Number 133
Cedar Mall
Owatonna 55060
(507) 451-7248

Team Electronics Number 066
350 Rosedale Center
Roseville 55113
(612) 636-5147

Team Electronics Number 004
110 6th Avenue South
Saint Cloud 56301
(612) 251-1335

Team Electronics Number 131
Crossroads Shopping Center
Saint Cloud 56301
(612) 253-8326

Schaak Electronics
1415 Mendota Heights Road
St. Paul 55120
(612) 454-6830

Team Electronics Number 002
455 Rice Street
St. Paul 55013
(612) 227-7223

Team Electronics Number 058
1733 South Robert Street
West St. Paul 55118
(612) 451-1765

MISSOURI

Kemper and Dodd Stereo
Town Plaza Shopping Center
Cape Girardeau 63701
314) 344-0578

Central Missouri A.V.
1000 West Broadway
Columbia 65201
(314) 874-2111

Computer Country North
235 Dunn Road
Florissant 63031
(314) 921-4434

High Technology/St. Louis
1847 Dunn Road
Florrisant 63033
(314) 838-6502

Computerland
1214-A South Noland Road
Independence 64055
(816) 461-6502

Personal Computer Center
11327 East 23rd Street
Independence 64055
(816) 254-7101

Computer Video Room
1811 Westport Road
Kansas City 64111
(816) 531-1050

Computers ASP Inc.
7115 Northwest Barry Road
Kansas City 64152
(816) 741-8013

Kaleidoscope
1316 North Baltimore
Kirksville 63501
(816) 665-1953

Computerland
11990 Dorsett Road
Maryland Heights 63040
(314) 567-3291

Computer Mart
1904-B East Meadow Mere
Springfield 65804
(417) 862-6500

Computer Country South
4479 Lemay Ferry Road
St. Louis 63129
(314) 487-2033

Forsyth Computers
7748 Forsyth Avenue
St. Louis 63105
(314) 721-4300

Futureworld Inc.
12304 Manchester Road
St. Louis 63131
(314) 965-4540

MISSISSIPPI

A & S Copy and Computer
44 North State Street
Jackson 39207
(601) 948-4673

Entertainment Electronics Ltd.$
1855 Lakeland Drive
Jackson 39216
(601) 981-7341

Southern Computing Systems
603 West Canal Street
Picayune 39466
(601) 798-2330

Waynesboro Electronics
608 Mississippi Drive
Waynesboro 39367
(601) 735-3431

MONTANA

Computer Store, The
1216 16th Street West
Billings 59102
(406) 245-0092

Team Electronics Number 035
613 Central Avenue, Box 2154
Great Falls 59401
(406) 453-3246

Team Electronics Number 037
1209 West Kent
Missoula 59801
(406) 549-4119

NEBRASKA

Team Electronics Number 137
148 Conestoga Mall Highway 2
Grand Island 68801
(308) 381-0559

Altair Computer Center
611 North 27th Street
Lincoln 68503
(402) 474-2800

Team Electronics Number 027
1844 North Street
Lincoln 68510
(402) 435-2959

Team Electronics Number 149
The Mall/1000 South Dewey
North Platte 69101
(308) 534-4645

American Computers
4442 South 84th Street
Omaha 68127
(402) 592-1518

Byte Shop
8525 Park Drive
Omaha 68127
(402) 339-7350

Computerland
11031 Elm Street
Omaha 68144
(402) 391-6716

Computers West
7423 Pacific South
Omaha 68114
(402) 393-2100

Team Electronics Number 028
304 South 72nd Street
Omaha 68114
(402) 397-1666

NEVADA

Century 23
4566 Spring Mountain Road
Las Vegas 89102
(702) 876-7997

Home Computers
1775 East Tropicana Number 2
Las Vegas 89109
(702) 736-6363

Byte Shop
4104 Kietzke Lane
Reno 89502
(702) 826-8080

NEW HAMPSHIRE

Bitz'N Bytes Computer Center
56-B Pleasant Street
Concord 03301
(603) 224-8233

Audio of New England
777 South Willow Street
Manchester 03103
(603) 668-4400

Computer Mart
170 Main Street
Nashua 03060
(603) 883-2386

Computerland
419 Amherst
Nashua 03060
(603) 889-5238

NEW JERSEY

Video World
Village Green Shopping Center
East Brunswick 08816
(201) 254-4111

Brielle Computer Store
400 Higgins
Brielle 08730
(201) 528-7773

Computer Emporium
Building 103 — Avenue of Americas
Cherry Hill 08002
(609) 667-7555

Computerland
1442 East Route 70 — Pine Tree Plaza
Cherry Hill 08034
(609) 795-5900

Shore Computers
Circle Plaza
Eatontown 07724
(201) 544-0022

Computer Nook, The
Pine Brook Plaza — Route 46 .
Pine Brook 07058
(201) 575-9468

Computer Corner of New Jersey
240 Wanague Avenue
Pompton Lakes 07442
(201) 835-7080

Computer Encounter
2 Nassau Street
Princeton 08540
(609) 924-8757

Stonehenge Computer Shop
89 Summit Avenue
Summit 07901
(201) 277-1020

Shore Computers
3 Washington Street
Toms River 08753
(201) 341-2288

Computer Mart of New Jersey
501 Route 27
Iselin 08830
(201) 283-0600

Computerland
74 Elm Street
Morristown 07960
(201) 539-4077

Computerland/Bergen City
Highway E65 Route 4
Paramus 07652
(201) 845-9303

NEW MEXICO

Computer Technologies
607-A San Mateo Northeast
Albuquerque 87108
(505) 266-9848

Southwest Computer Center
121 Wyatt Drive Number 7
Las Cruces 98001
(505) 526-2842

NEW YORK

Micro Systems Store Inc.
269 Osborne Road
Albany 12211
(518) 459-6140

Digital Designs
870 Willis Avenue
Albertson 11507
(516) 742-1800

Computerland
1612 Niagara Falls Boulevard
Buffalo 14150
(716) 836-6511

Computerland
79 Westbury Avenue
Carle Place 11514
(516) 742-2262

Computer Shop of Syracuse
3470 Erie Boulevard East
Dewitt 13214
(315) 446-1284

Computer Tree
409 Hooper Road
Endwell 13760
(607) 748-1223

Computer Word Inc., The
422 Northern Boulevard
Great Neck 11021
(516) 487-7830

Binary Orchard
S-5854 Camp Road
Hamburg 14075
(716) 648-7167

Applied Microcomputer Systems
Fairfield Plaza
Hudson 12534
(518) 828-3565

B C Communications Inc.
207 Depot Road
Huntington Station 11746
(516) 692-2735

Computerland
225 Elmira Road
Ithaca 14850
(607) 277-4888

Micro World Computer Store
435 Main Street
Johnson City 13790
(607) 798-9800

Byte Shop East
2721 Hempstead Turnpike
Levittown 11657
(516) 731-8116

Li Computer General Store
103 Atlantic Avenue
Lynbrook 11563
(516) 887-1500

Computer Micro Systems
1311 Northern Boulevard
Manhassett 11030
(516) 627-3640

Eastern Tech Electronics
213 Broadway
Menands 12204
(518) 434-1412

Byte Shop East Inc.
130 East 40th Street
New York 10016
(212) 889-4204

Computer Factory
485 Lexington Avenue
New York 10017
(212) 687-5001

Datel Systems Corporation
1211 Avenue of Americas
New York 10036
(212) 921-0110

Harmony House II
1167 York Avenue
New York 10021
(212) 751-9188

McGraw Hill Bookstore
1221 Avenue of Americas
New York 10020
(212) 997-4100

New York Astrology Center
127 Madison Avenue
New York 10016
(212) 679-5676

Super Business Machines
95 Trinity Place
New York 10006
(212) 943-4130

Video Mart
514 West 57th
New York 10019
(212) 246-4114

Communications Tech Group
448 Merrick Road
Oceanside 11572
(516) 536-5724

ASD Home Computer Center
Van Wyck Plaza
Poughkeepsie 12603
(914) 473-9400

Micro Computer World
519 Boston Post Road
Port Chester 10573
(914) 937-6662

Custom Computer Specialists
208 Roanoke Avenue
Riverhead 11901
(516) 369-2199

Computer Store / Rochester
2423 Monroe Avenue
Rochester 14618
(716) 244-5000

Home Computer Center
671 Monroe Avenue
Rochester 14607
(716) 244-6237

Video World
2716 Erie Boulevard East
Syracuse 13224
(315) 446-5357

Phone World Inc.
1028-A Union Road
West Seneca 14224
(716) 675-7016

Mr. Computer
Imperial Plaza Route 9
Wappingers Falls 12590
(914) 297-1223

Audiotech Computer Shop
Route 28
West Hurley 12491
(914) 679-2559

Computer Corner, The
200 Hamilton Avenue / Mall
White Plains 10601
(914) 949-3282

Phone World International
4239 Transit Road
Williamsville 14221
(716) 633-2220

NORTH CAROLINA

Byte Shop
6341 Albemarie Road
Charlotte 28212
(704) 568-8100

Compushop Distributing
1937 South Interstate 85
Charlotte 28204
(704) 399-4136

Computer Room
4231 Monroe Road
Charlotte 28205
(704) 377-9821

Computerland / Charlotte
3915 East Independence Boulevard
Charlotte 28205
(704) 536-8500

Computer Works Inc.
2514 University Drive
Durham 27707
(919) 489-7486

Byte Shop
218 North Elm Street
Greensboro 27401
(919) 275-2983

Carolina Business Computers
350 3rd Avenue Northwest
Oakwood Center
Hickory 28601
(704) 328-3939

Southern Computer Systems
105 East Franklin Street
Monroe 28110
(704) 289-4080

Byte Shop
1213 Hillsborough Street
Raleigh 27605
(919) 833-0210

NORTH DAKOTA

Team Electronics Number 030
2304 East Broadway, Box 1512
Bismark 58501
(701) 223-4546

Team Electronics Number 026
1503 11th Avenue, Box 1277
Grand Forks 58201
(701) 746-4474

Team Electronics Number 032
209 11th Southwest, Box 536
Minot 58701
(701) 852-3281

OHIO

Basic Computer Shop, The
2671 West Market Street—Fairlawn
Akron 44312
(216) 867-0808

Compushop
16 Convention Way
Cincinnati 45201
(513) 651-2111

Compushop
4816 Interstate Drive
Cincinnati 45246
(513) 874-0600

Graham Electronics Supply
239 Northland Boulevard
Cincinnati 45246
(513) 772-1661

Computerland / Cleveland East
1288 Som Center Road
Cleveland 44124
(216) 461-1200

Computerland / West
4579 Great Northern Boulevard
Cleveland 44070
(216) 777-1433

Computerland
6429 Busch Road
Columbus 43229
(614) 888-2215

Cybershop
1415 South Hamilton Road
Columbus 43227
(614) 239-8081

Personal Computers
3280 Morse Road
Columbus 43229
(614) 475-2609

Computer Solutions
1932 Brown Street
Dayton 45409
(513) 223-2348

Micro Computer Center / Dayton
7900 Paragon Road
Dayton 45459
(513) 435-9355

OKLAHOMA

Contemporary Sounds Inc.
432 South Van Buren
Enid 73701
(405) 233-3883

High Technology
1808 Liberty
Lawton 73501
(405) 353-4497

Pro-Am Photo and Microcomp
513 West Gray
Norman 73069
(405) 364-5992

Bits Bytes and Micros
2918 North MacArthur Boulevard
Oklahoma City 73127
(405) 947-5646

High Technology (Retail)
1611 Northwest 23rd Street
Oklahoma City 73106
(405) 528-8008

Team Electronics Number 086
1867 Penn Square
Oklahoma City 73118
(405) 848-5573

Team Electronics Number 115
7000 Crossroads Space 2010
Oklahoma City 73149
(405) 634-3357

Computerland
10621 North May Avenue
Oklahoma City 73120
(405) 755-5200

High Technology
2601-D South Memorial
Tulsa 74129
(918) 664-9754

OREGON

Byte Shop Northwest
3482 S.W. Cedar Hills Boulevard
Beaverton 97005
(503) 644-2686

Team Electronics Number 151
1023 Southwest First
Canby 97013
(503) 266-2539

Computer Store Corvallis
2015 Northwest Circle Boulevard
Corvallis 97330
(503) 754-0811

Computer Solutions
1170 Garfield
Eugene 97402
(503) 484-6376

Custom Computer Corporation
259-2 Barnett Road / K-Mart Plaza
Medford 97501
(503) 779-2983

F & H Sound Production
1516 Southwest Immigrant
Pendleton 97801
(503) 276-3772

Byte Shop
2033 Southwest Fourth Avenue
Portland 97201
(503) 223-3496

Cameras and Computer Emporium
921 Southwest Morrison
Portland 97205
(503) 228-5242

Team Electronics Number 129
2230 Fairground Road Northeast
Salem 97303
(503) 364-3289

Computerland
12020 Southwest Main Street
Tigard 97223
(503) 620-6170

PENNSYLVANIA

Byte Shop
1045 Lancaster Pike
Bryn Mawr 19010
(215) 525-7712

Erie Computer Company
2127 West Eighth Street
Erie 16502
(814) 454-7652

T J Enterprises
Route 40E
Grindstone 15442
(412) 785-5311

Zelie Office Equipment
Northgate Center — Route 19 North
Harmony 16037
(412) 452-9821

Newell's Valley TV
On the Diamond
Ligonier 15658
(412) 238-2381

Computerland / Harrisburg
4644 Carlisle Pike
Mechanicsburg 17055
(717) 763-1116

Computer Workshop—Pittsburgh
3848 William Penn Highway
Monroeville 15146
(412) 823-6722

Television Parts Company
518 Fifth Avenue
New Brighton 15066
(412) 846-3000

Computerland
81 East Lancaster Avenue
Paoli 19301
(215) 296-0210

Personal Computer Corporation
24-26 West Lancaster Avenue
Paoli 19301
(215) 647-8463

University Business Machines
37229 Locust Walk
Philadelphia 19174
(215) 387-5955

Computer House, The
1000 Greentree Road
Pittsburgh 15220
(412) 921-1333

Compucon
3672 Marietta Avenue / P.O.B. 30
Silver Springs 17575
(717) 285-3440

Computer Source
546 Penn Avenue
West Reading 19602
(215) 378-1149

Computerland / Lehigh Valley
1457 MacArthur Road
Whitehall 18052
(215) 776-0202

RHODE ISLAND

Computer Store, The
1500 Oaklawn Avenue
Cranston 02910
(401) 463-8160

Digital W...
329 Bald...
Warwick...

SOUTH CAROLINA

Byte Shop
1920 Blosson Street / P.O.B. 5144
Columbia 29205
(803) 771-7824

CDS Micro-Computers Inc.
214 West Evans Street
Florence 29501
(803) 669-3716

Datamart Inc.
1901 Laurens Road
Ye Olde Towne Square
Greenville 29607
(803) 233-5753

SOUTH DAKOTA

Team Electronics Number 040
1101 Omaha Street
Rapid City 57701
(605) 343-8363

Computer Systems Design
2525 West Main Street Number 216
Rapid City 57701
(605) 341-3662

Team Electronics Number 011
613 West 41st Street
Sioux Falls 57105
(605) 336-3730

Team Electronics Number 132
4001 West 41st Street
Sioux Emporium Mart
Sioux Falls 57106
(605) 339-2237

Team Electronics Number 019
223 9th Avenue Southeast
Watertown 57201
(605) 886-4725

TENNESSEE

Rush Electronics Inc.
1315 Bluff City Highway
Bristol 37620
(615) 764-0831

Eastern Microcomputer Store
5613 Kingston Park
Knoxville 37919
(615) 584-8365

Mid-South Data Processing Service
13 Emory Park
Knoxville 37917
(615) 523-3427

Computerlab of Memphis
627 South Mendenhall Road
Memphis 38117
(901) 761-4743

Opus 2
4284 Summer Avenue
Memphis 38122
(901) 682-2455

Doc's Computer Center
1016 8th Avenue South
Nashville 37203
(615) 254-5085

TEXAS

Computer Corner
1800 South Georgia
Amarillo 79109
(806) 355-5618

Computerland
3300 Anderson Lane
Austin 78757
(512) 452-5701

Computer 'N' Things
2825 Hancock Drive
Austin 78731
(512) 453-5970

KA Electronic Sales
8910 Research Boulevard
Austin 78758
(512) 458-2257

Young Electronics Service
1808 'F' Brothers Boulevard
College Station 77840
(713) 693-8080

Microcomputer Shoppe
5301 Everhart — Shop H
Corpus Christi 78411
(512) 855-4516

Compushop
13929 North Central Avenue
Dallas 75243
(214) 234-3412

Computer Imagineering UN
2825 Valley View Lane Number 112
Dallas 75234
(214) 247-6393

Computerland/Dallas
8061 Walnut Hill Lane Street
Dallas 75231
(214) 363-2223

KA Computer Store
9090 Stemmons Freeway
Dallas 75247
(214) 634-7870

Compu Shop
6353 Camp Bowie Boulevard
Fort Wayne 76116
(817) 738-4442

Comtel Inc.
5970 Broadway Boulevard
Garland 75043
(214) 563-8428

KA Electronic Sales
1117 South Jupiter
Garland 79042
(214) 494-2488

Compu Shop
211-A FM 1960 West Cypress Street
Houston 77090
(713) 893-2060

Computer City
12704 North Freeway
Houston 77060
(713) 821-2702

Computer Craft
3211 Fondren
Houston 77063
(713) 977-0664

Computer Center of Houston
2129 Westheimer
Houston 77098
(713) 527-8008

Computerland
6439 Westheimer
Houston 77057
(713) 977-0909

Computerland
Camino Village
17647 El Camino
Houston 77058
(713) 488-8153

Foleys Distribution Center
2103 Ernestine
Houston 77223
(713) 651-6863

Interactive Computers
7620 Dashwood
Houston 77036
(713) 772-5257

Kwik Kopy Computers
5225 Hollister Road
Houston 77040
(713) 939-1010

Microage Computer Store
1220 Melbourne Drive
Hurst 76053
(817) 284-3413

Spinet Music
2819 North Street
Nacogdoches 75961
(713) 564-8311

Computer Patch
3952 'U' E / 42nd Street
Odessa 79762
(915) 563-3506

Byte Shop
1490 West Spring Valley Road
Richardson 75080
(214) 234-5955

Computerland
1535 Promenade Center
Richardson 75080
(214) 235-1285

Concho Communications
3102 Knickerbocker Road
San Angelo 76901
(915) 949-8365

Computer Shop, The
6812 San Pedro
San Antonio 78216
(512) 828-0553

Computer Solutions
5135 Fredericksburg Road
San Antonio 78229
(512) 341-8851

Wichita Computer Systems
210 Free-Mar Valley
Wichita Falls 76301
(817) 723-6006

UTAH

Cooks Inc.
84 West First North
Logan 84321
(801) 752-6432

Computer Specialists Inc.
635 25th / P.O.B. 96
Ogden 84401
(801) 393-7375

Allen's Camera and Sound
36 North University
Provo 84601
(801) 373-4440

Computer Hub
5899 South State
Salt Lake City 84107
(801) 252-5416

Inkley Photo Centers
1984 South State Street
Salt Lake City 84115
(801) 486-3921

Inkley's
137 South Main
Salt Lake City 84115
(801) 328-0561

Computerland/Salt Lake City
161 East Second South
Salt Lake City 84111
(801) 364-4416

Computer Room, The
1515 South 1500E
Salt Lake City 84105
(801) 466-8345

VERMONT

Computer Mart of Vermont
159 Pearl Street
Essex Junction 05452
(802) 879-6535

Electronic Applications
39 Merchants Row
Rutland 06701
(802) 773-3415

Macdata
733 Queen City Park Road
South Burlington 05401
(802) 658-2161

VIRGINIA

Computers Plus Inc.
6120 Franconia Road
Alexandria 22310
(703) 971-1996

Piedmont Computers
Box 197-B Route 250
Greenwood 22943
(804) 823-5232

Computer Works, The
Route 6, Box 65A
Harrisonburg 22801
(703) 434-1120

Chaney Computer Services
Tidemill Shop Center/Gloucester
Hayes 23072
(804) 642-2138

Tyson's Computer Emporium
1984 Chain Bridge Road
McLean 22101
(703) 821-8333

Home Computer Center
12588 Warwick Boulevard
Newport News 23607
(804) 595-1955

Computer Techniques Inc.
9207 Midlothian Turnpike
Richmond 23235
(804) 320-7933

Computer Place, The
2718 Colonial Avenue Southwest
Roanoke 24015
(703) 982-3661

Computer Workshop
5240 Port Royal Road
Springfield 22151
(703) 321-9047

Computerland, DC
8411 Old Courthouse Road
Tyson's Corner 22180
(703) 893-0424

Home Computer Center
2927 Virginia Beach Boulevard
Virginia Beach 23452
(804) 340-1977

WASHINGTON

Computerland
14340 Northeast 20th
Bellevue 98007
(206) 746-2070

Omega Computer
839 106th Avenue Northeast
Bellevue 98004
(206) 455-1138

Western Micro Computer Center
4204 Guide Meridian
Bellingham 98225
(206) 676-9558

Computerland
1500 S. 336 Street No. 12/Parkway C
Federal Way 98003
(206) 838-9363

Korten's Inc.
1400 Commerce Avenue
Longview 98632
(206) 425-3400

Team Electronics Number 161
1024 14th Street
Longview 98632
(206) 425-3600

Omega Computers
5421 196th Avenue Northeast
Lynnwood 98036
(206) 775-7585

Sounds Great
1301 B Riverside Drive
Mount Vernon 98273
(206) 424-4354

United Business Machines/NW
604 South Third
Mount Vernon 98273
(206) 336-9541

ICM Computer Systems
716 First Avenue South
Okanogan 98840
(509) 422-6579

ABS Computer Center
122 North Capitol Way
Olympia 98501
(206) 943-9628

Ye Olde Computer Shoppe
1301 George Washington Way
Richland 99352
(509) 946-3330

Empire Electronics Inc.
616 West 152nd
Seattle 98166
(206) 244-5200

Omega Computers
1032 Northeast 65th
Seattle 98155
(206) 522-0220

Electro-Mart Factory
East 3611 Sprague Avenue
Spokane 99202
(509) 535-2451

Personal Computers Inc.
South 104 Freya
Spokane 99202
(509) 534-3955

Computerland
8791 South Tacoma Way
Tacoma 98449
(206) 581-0388

Empire Electronics
894 Southcenter Mall
Tukwila 98188
(206) 246-6120

Cliff Miller's Cameras
2076 Yakima Mall
Yakima 98901
(509) 575-8806

Cliff Miller's Cameras
22 North Second Street
Yakima 98901
(509) 248-1585

Team Electronics Number 127
423 West Yakima
Yakima 98902
(609) 453-0313

WISCONSIN

Sound World
3015 West Wisconsin
Appleton 54911
(414) 733-8539

Team Electronics Number 006
2321 East Clairemont Parkway
Ea Claire 54701
(715) 834-1288

Byte Shop/Milwaukee
6019 West Layton
Greenfield 53220
(414) 281-7004

Team Electronics Number 017
1505 Losey Boulevard South
Lacrosse 54601
(608) 788-2250

American TV
2202 Beltline
Madison 53713
(608) 271-3322

Blue Lakes Computing
438 North Frances
Madison 53703
(608) 257-4424

Computerland/Madison
690 South Whitney Way
Madison 53711
(608) 273-2020

Team Electronics Number 008
3365 East Washington Avenue
Madison 53704
(608) 244-1339

Computerland/Milwaukee
10111 West Capitol Drive
Milwaukee 53222
(414) 466-8990

Team Electronics Number 015
7512 West Appleton Avenue
Milwaukee 53126
(414) 461-7800

Team Electronics Number 075
3301-3500 South 27th Street — South
Milwaukee 53215
(414) 672-7600

Video Experience
11521 West North Avenue
Milwaukee 53214
(414) 453-2444

Computerlab
218 North Commercial Street
Neenah 54956
(414) 725-3020

Computerlab
311 Park Plaza
Oshkosh 54901
(414) 233-7480

Colortron Computer Division
2111 Lathrop
Racine 53405
(414) 637-2003

Team Electronics Number 128
Sunrise Plaza / Highway 8 East
Rhinelander 54501
(715) 369-3900

Team Electronics Number 018
2207 Grand Avenue
Wausau 54401
(715) 842-3364

WYOMING

Team Electronics Number 126
207 South Montana
Casper 82601
(307) 235-6691

Team Electronics Number 152
Cole Shopping Center Number 432
Cheyenne 82001
(307) 635-2836

D D Camera Corral
60 Broadway
Jackson 83001
(307) 733-3831

Team Electronics Number 108
2207 Grand Avenue
Wausau 54401
(715) 842-3364

AUSTRALIA

Computerland/Sydney
55 Clarence Street
Sydney NSW Australia 2
TLX AA 24657

CANADA

Computerland
678 Guelph Line Number 1
Burlington Ontario L7R 3M8
(416) 632-5722

Compushop
4014 MacLeod Trail South
Calgary Alberta T2G 3R7
(403) 243-4846

Computerland
1212 First Street Southeast
Calgary Alberta T2G 2H8
(403) 237-6423

Computer Shop, The
3515 18th Street Southwest
Calgary Alberta T2T 4T9
(403) 243-0301

Compu Shop of Alberta
723 14th Street Northwest
Calgary Alberta T2N 2A4
(403) 283-0751

Galactica Computers Limited
10021 103rd Avenue
Edmonton Alberta
(403) 424-1755

Personal Computers
10991 124th Street
Edmonton Alberta   T5M 0H9
(403) 455-5298

Central Distributors Limited
350 Des Erables
Lacine Quebec H8Z 2P9
(514) 364-4222

Vulcan Computer Systems
20571 Fraser Highway
Langley British Columbia V3Z 4G4
(604) 530-8572

Compucentre (Eastside)
Galeries D'Anjou
Montreal Quebec
(514) 351-2798

Compucentre Computer Center
Place Bonaventure
Montreal Quebec
(514) 866-5944

Compucentre Computer Center
Place Ville Marie
Montreal Quebec H1J 1Z4
(514) 866-0475

Cesco Electronics
4050 Jean Talon Street West
Montreal Quebec H4P 1W1
(514) 735-5511

Compucircuit Inc.
400 Dorchester Boulevard West
Montreal Quebec H2Z 1V5
(514) 866-9512

Futur Byte Computers
1191 Phillips Square
Montreal Quebec H3P 2Z1
(514) 861-3120

Computer Innovations Limited
171 Slater Street
Ottawa Ontario K1P 5H7
(613) 233-8413

Compumart
411 Roosevelt Avenue
Ottawa Ontario K2A 3X9
(613) 725-3192

Compucentre (Westside)
Fairview Shopping Center
Point Claire Quebec
(514) 695-3620

Custom Computing Systems
1965 Hamilton Street
Regina Saskatchewan
(306) 242-7808

Micro Shack of West Canada
333 Park Street
Regina Saskatchewan
(306) 543-4079

Custom Computing Systems Inc.
122 Second Avenue North
Saskatoon Saskatchewan S7K 2B2
(306) 242-7808

Light Computer Limited
Scarborough Town Center
Scarborough Ontario M1P 4P5
(416) 296-2406

Computerland
2180 Yonge Street
Toronto Ontario M4S 2B9
(416) 485-6700

Compucentre
20 Bloor Street East
Toronto Ontario
(416) 961-5978

Compucentre
219 Yonge Street
Toronto Ontario
(416) 598-1628

Byte Shop/Vancouver
2151 Burrard Street
Vancouver British Columbia
(604) 736-0511

Compushop
1500 West O
Vancouver B.C. V6G 2Z6
(604) 687-5545

C G Computer City Inc.
153 Portage Avenue
Winnipeg Manitoba R3G 0V5
(204) 786-3381

Computerland/Winnipeg
715 Portage Avenue
Winnipeg Manitoba R3G 0M8
(204) 772-9519

C C Computer City Inc.
153 Portage Avenue
Winnipeg Manitoba R3G 0V5
(204) 786-3381

JAPAN

BMC International/Uemachi Bldg. 3
Higashi-Ku
Osaka 540
768-7791

ESD Labs
6-16-3 Hongo Bunkyo
Tokyo

Kashiwagi Research Corporation
2-19-11 Oabadai Meguro-Ku
Tokyo
03-719-4641

KOREA

Korea Software Institute
138-107 Yongdoc-Dong
Dongdaemoon-Ku
Seoul

MEXICO

Microprocesadoras
Sierra Nevada 670
Mexico 10 DF
520-06-19

Micro Computadoras SA
Avenue Popcatepetl—196 Loc
Mexico 13 DF
(905) 524-9549

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