

**APPLE PERIPHERALS**

**by**

**APPLIED ENGINEERING**

Dear Customer:

Applied Engineering makes more kinds of peripherals for the Apple than any other company. Since our inception in 1979, Applied Engineering has continually expanded its line of Apple peripherals, bringing you easy-to-use designs.

We are the innovators not the imitators. Utilizing state-of-the-art technologies, Applied Engineering is continually improving its products. This catalog represents our most recent developments. Applied Engineering offers you the highest quality peripherals at the lowest possible price.

We are not afraid to completely redesign a product when new technologies allow it to be done in a better way. Many of the designs in this catalog are new designs that replaced an earlier product. Applied Engineering plans on taking the Apple right into the 21st century, because the Apple is not just a computer, it has become a standard.

We are unmatched in software support. For example, our real time clock comes with over 35 programs on 2 disks, many contributed by our customers. Our music synthesizer includes 2 disks full of songs ready to run.

Whereas our competitors must divide their engineering time between IBM, Atari, Radio Shack, or other computers, our engineers only design products for the Apple. This dedication allows us to become more familiar with the Apple and those who use them.

Applied Engineering's products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a three year no hassle warranty.

# MEMORYMASTER IIe

## 128K RAM CARD FOR THE APPLE IIe

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- TOTALLY compatible with ALL Apple IIe 80 column and extended 80 column card software — there are NO exceptions.
- Available in 64K and 128K configurations.
- The 64K configuration is USER upgradeable to 128K.
- Can also be used as a solid state disk drive to make your programs run over 20 times faster (the 64K configuration will act as half a drive).
- Bank select LED's for each 64K bank.
- Permits your IIe to use double high resolution graphics.
- The 64K MEMORYMASTER IIe will automatically expand VisiCalc to 95K storage, in 80 columns! The 128K MemoryMaster IIe will expand VisiCalc to 141K storage with optional pre-boot disk.
- Uses the same commands as the Apple 80 column card.
- Plugs into the Auxiliary slot in the Apple IIe.
- Fully Pascal and CP/M compatible.
- Lowest power consuming 128K card available.
- Complete documentation included.
- PRO-DOS will automatically use the MEMORYMASTER IIe as a high speed disk drive.

The MEMORYMASTER IIe uses the same commands as the Apple 80 column and extended 80 column card. The MEMORYMASTER IIe has one additional command to switch its two 64K banks, this makes the MEMORYMASTER IIe very easy to use. You can use the MEMORYMASTER IIe as a high speed disk drive with the optional RAMDRIVE IIe software. The RAMDRIVE IIe software features audio-visual access indicators, easy setup for turnkey operation, and menu driven documentation. The program can be modified and is copyable. When used with the 64K configuration MEMORYMASTER IIe, it will act as half a drive. When you upgrade to 128K, RAMDRIVE will automatically use it as a full drive. If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. The board is fully socketed so you simply plug in your chips.

MEMORYMASTER IIe with 128k	\$249
Upgradeable MEMORYMASTER IIe with 64K	\$169
Non-Upgradeable MEMORYMASTER IIe with 64K	\$149

See reverse side for information on optional software for the  
MEMORYMASTER IIe

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P.O. Box 798  
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# MEMORY MASTER IIe

## SOFTWARE OPTIONS

### Ram Drive IIe

Ram Drive IIe works with either the 64K or 128K MemoryMaster IIe to give you a high speed solid state disk drive. The Ram Drive IIe software features audio-visual access indicators, easy setup for turnkey operation, and easy menu driven documentation. The program can be modified and is copyable. If you have a 64K MemoryMaster, Ram Drive IIe will act as half a disk drive. If you have a 128K MemoryMaster, Ram Drive IIe will act as a full disk drive. Either way, your programs will load and save over 20 times faster. Ram Drive IIe is compatible with APPLESOFT, DOS3.3, PRO-DOS, and PASCAL. Disk also includes a high speed RAM disk copying program. Ram Drive is another disk drive only 20 times faster.

**PRICE \$29**

### CP/M Ram Drive IIe

CP/M Ram Drive IIe is just like the Ram Drive IIe above, only for CP/M.

CP/M Ram Drive IIe runs on any Z-80 card that runs standard CP/M i.e. Applied Engineering Z-80 Plus or Microsoft Soft Card. CP/M Ram Drive will dramatically speed up the operation of most CP/M software because CP/M normally goes to disk fairly often. Fast acting software like dBase II and Wordstar become virtually instantaneous when used with CP/M Ram Drive.

**PRICE \$29**

### VC IIe Expander

VCIIe Expander will give owners of VisiCalc IIe and the 128K MemoryMaster a total of 141K work space. This disk will pre-boot VCII in 1.5 seconds.

**PRICE \$29**

### Advanced VCIIe Expander

Advanced VCIIe Expander is just like VCIIe Expand only it is designed for Advanced VCIIe. Your work space will be increased to 131K. This disk will pre-boot in 1.5 seconds.

**PRICE \$29**

### Apple Works Expand

Although Apple Works is compatible with both a 64K and 128K MemoryMaster IIe, Apple Works only "sees" it's first 64K bank. Our Apple Works expand program will make a modification to Apple Works that simply lets it know you've got more memory, giving you 101K work space.

**PRICE \$29**



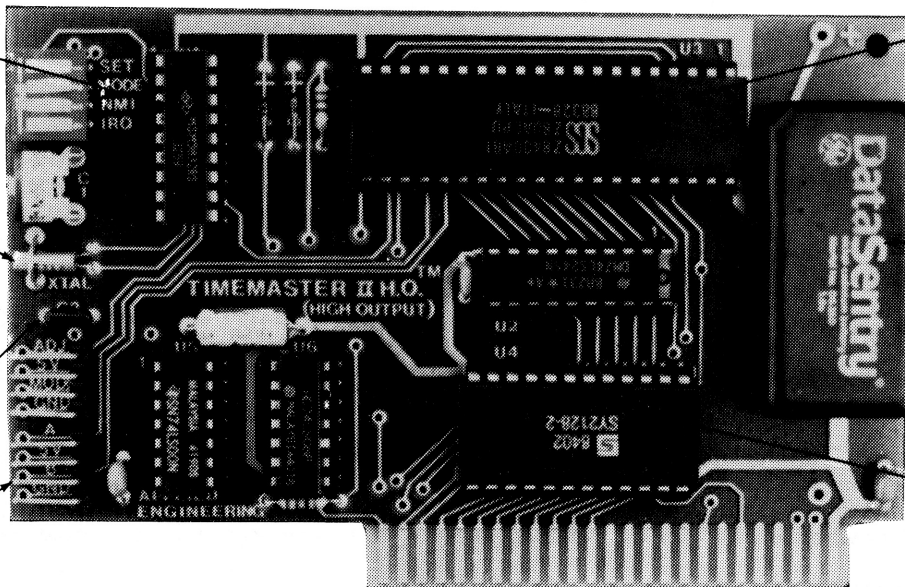
# TIMEMASTER II H.O.

Very powerful, state of art CMOS, metal gate clock chip

Quartz crystal, sealed in a stainless steel housing

Mylar oscillator capacitor (others use ceramic which can cause the clock to speed up or slow down as the temperature changes inside your Apple)

Two BSR/serial ports for future expansion



On-board microprocessor based controller chip

Rechargeable nickel-cadmium battery will keep the H.O. running for over 6 months with power off, and under most conditions will last over 20 years

Super smart 2K eeprom (most other clocks use only 1K) knows just what features to drop off when emulating other clocks. Also has firmware for BSR home control for easy programming.

- Meets and surpasses all protocols as defined by Apple
- Absolutely, positively, totally PRO-DOS and DOS 3.3 compatible
- Time in hours, minutes, seconds and milliseconds (the ONLY PRO-DOS compatible card with millisecond capability)
- 24 hour military format or 12 hour with AM/PM format
- Date with year, month, day of week and leap year (other clocks say they have the year, but they don't; it's just that PRO-DOS will calculate the year based on day of week and date and it only does this for 7 years)
- The easiest programming in BASIC
- Fully buffered data buss
- Eight software controlled interrupts so you can run two programs at the same time (many examples are included)
- Compatible with ALL of Apple's languages. Sample programs for machine code, Applesoft, CP/M and Pascal on 2 disks
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond

## H.O. FOR THOSE WHO NEED IT, SIMPLICITY

At first, all clock cards seem to give you about the same things. Until you put them to work. Then you'll find out if they do everything you expected. Or make you do everything the hard way or maybe they won't even do it at all.

You know what makes the difference? It's not just having the newest, whizziest features, but rather what those features actually do for you in the real world. And that's the whole idea behind the Timemaster II H.O. because the H.O. is designed to work with you in a natural, intuitive way.

What we're really talking about here is useability. When you get right down to it, it's not any one big thing, but a combination of a lot of little things. Like full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the H.O. to emulate other clocks, we just drop off features. That's why the H.O. can emulate others, but none of the others emulate us.

The Timemaster II H.O. will automatically emulate the correct clock card for the software you're using. You can also give the H.O. a simple command to tell it which clock to emulate. This is great for writing programs for those poor unfortunates that bought some other clock card.

Of course, most programs will use the Timemaster II H.O. in its native mode, but its comforting to know that you can use programs written for other products without any modification.

### **H.O. FOR THOSE WHO CAN HANDLE IT, PERFORMANCE**

If you program, (or are learning to) you'll find the H.O. a joy to use, a 36 page manual has many program examples. Soon you'll wonder how you ever got along without your H.O. And speaking of software, you also get 2 disks full of some really fantastic sample programs in machine code, DOS 3.3, PRO-DOS, BASIC, PASCAL and CP/M. Hobbyist take note; most of the machine code programs come with their source code on disk. In Pascal, the H.O. will update the files and disks with the correct date and time. All routines are installed in the SYSTEM LIBRARY for easy use. You'll never use the Date command again! Other software includes Appointment Book so you'll never forget to do anything again. Just enter appointments up to a year in advance then forget them, Appointment Book will remind you.

As for PRO-DOS, well the H.O. is totally PRO-DOS compatible. The H.O. works with PRO-DOS software like Apple Works, Catalyst IIe, Word Juggler and ALL other PRO-DOS software. And let's get one other thing out of the way - No other clock is more compatible with PRO-DOS than the Timemaster II H.O.; none, zero, zip.

Dos 3.3 users will appreciate our Dos-Dater software, which upgrades the DOS on your disks so that DOS 3.3 will use the H.O. to time and date (including the year) disk files. Every time a program is saved or modified, the time and date are stored in the CATALOG with the name. You can now tell when a program was saved or when any file was last modified, and this date stamping feature is completely automatic.

### **REMOTE CONTROL**

Our BSR X-10 interface option for the H.O. allows you to remotely control lights and electrical appliances through your BSR X-10 home control system in your home or office. You're already wired because a BSR system sends its signals over regular 120 volt wiring. That means you can control any electrical device in your home or office without any additional wiring.

The X-10 is easy to program because it is controlled by firmware in ROM on the Timemaster II H.O.. One simple command will turn on or off any appliance or light (lights can be brightened or dimmed too). Use your Apple for security lighting, heating and A.C. control, lab/process control, waking up Junior, re-waking up Junior and controlling your T.V. set (just think, you need not miss another episode of Star Trek).

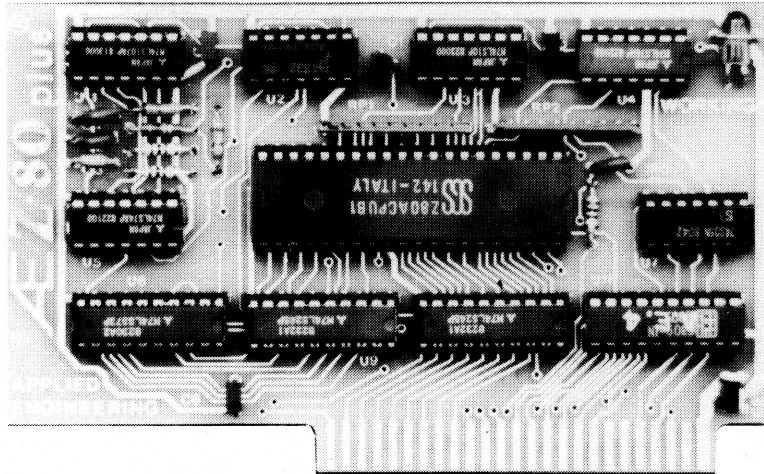
Is the Timemaster II H.O. a simple, easy to use clock for beginners? Or a sophisticated high performance peripheral for the experienced? The answer is "YES". And when you think about it, aren't those two products, the one you need now?

**Price \$129**  
**BSR Option \$49**

**APPLIED ENGINEERING**  
**P.O. Box 798**  
**Carrollton, Texas 75006**

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# Z-80 PLUS



- Totally compatible with all CP/M software.
- Executes the full Z-80, 8080 and 8085 instruction set.
- Fully compatible with Microsoft disks (no pre-boot required as with others).
- Does everything the other Z-80 cards do plus supports Z-80 interrupts.
- Specifically designed for High speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Red "CPM Working" LED indicator, the Z-80 Plus does not interfere with non-CP/M programs.
- An on-card ROM eliminates many I.C.'s for a cooler, less power consuming board.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level.
- Runs on any Apple II, II+ or IIe with at least 48K memory. Works with any 80 column card, but does not require one.
- The Z-80 Plus will allow you to run: dBase II, Wordstar, Spell Star, Cobol-80, Fortran-80, Peachtree and ALL other CP/M based software.
- Fast Clock: 4MHZ
- Documentation included
- High quality P.C. board, gold plated connector, all I.C.'s in high quality sockets, with mil. spec. components used throughout.
- Three year warranty.

With the Z-80 Plus, you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

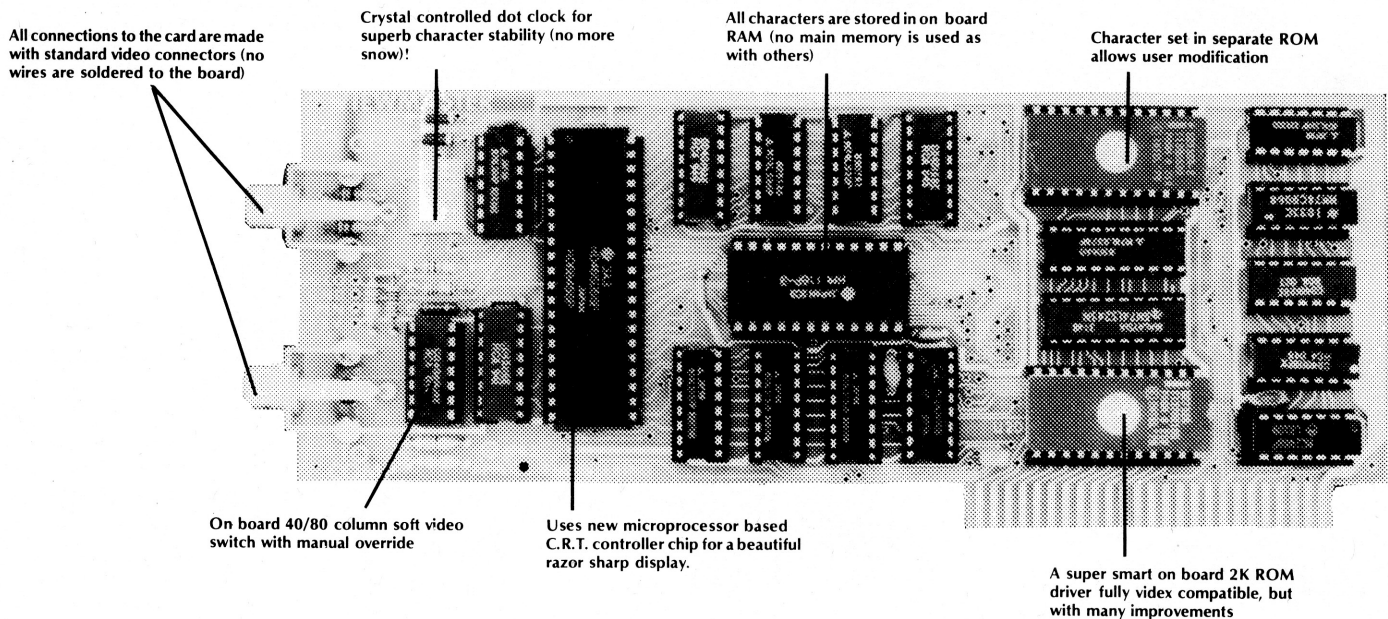
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# THE VIEWMASTER

*The Ultimate 80 Column Card for the Apple II or Franklin*



**There used to be about a dozen 80 column cards for the Apple, Now There's Only ONE!**

- All new design
- 80 characters by 24 lines
- Fully compatible with all Apple languages and software
- Very sharp 7x9 character matrix with true descenders
- Power and input connector for light pen
- Very low power consumption through the use of CMOS devices
- Upper and lower case characters, both inverse and normal
- All on-screen editing functions are supported
- User defineable cursor shape
- Three Year Warranty

Total compatibility is the secret to the VIEWMASTER'S great success. The VIEWMASTER works with all 80 column applications including CP/M, Pascal, Wordstar, Format II, Easywriter, Applewriter II, Supertext 80, Zardax, Apple PI, Letter Perfect, dBase II, Visicalc, Multiplan, and hundreds of others.

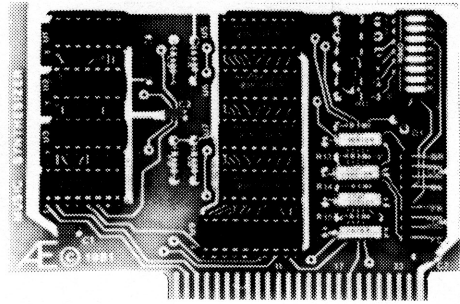
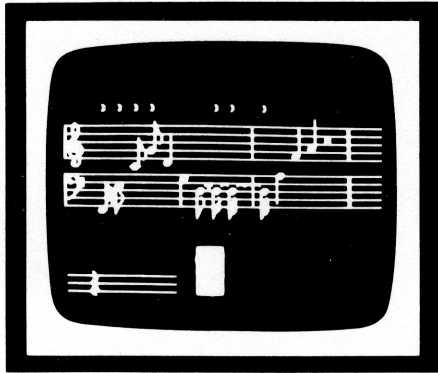
Whether you're buying your first 80 column card or replacing a less powerful one, you'll appreciate the many extra features built in to the VIEWMASTER. There are no options available for the VIEWMASTER because every feature of every 80 column card is already in the VIEWMASTER. The VIEWMASTER is compatible with the Apple II, II+, IIe and Franklin computers.

**PRICE: \$179.00**

Texas Residents Add 5% Sales Tax  
Add \$10.00 If Outside U.S.A.  
Dealer Inquiries Welcome

Send Check or Money Order to:  
APPLIED ENGINEERING  
P.O. Box 798  
Carrollton, TX 75006

Call (214) 492-2027  
8 a.m. to 11 p.m. 7 days a week  
MasterCard, Visa & C.O.D. Welcome  
No extra charge for credit cards



## SUPER MUSIC SYNTHESIZER

- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo and boot the disk (supplied) and you're ready to enter and play songs.
- It's easy to program music with our "COMPOSE" software. You'll start right away at inputting your favorite songs. Our manual shows you how, step by step. The Hi-Res screen shows what you've entered in standard sheet music format (see photo above).
- No programming experience is required to use the Super Music Synthesizer; ideal for the computer hobbyist, professional or amateur musician and children.
- We give you lots of software. In addition to Compose and Play programs, the disk is filled with over 30 songs ready to play.
- Plays music in true stereo as well as true discrete quadraphonic.
- Automatic shutoff on power-up or if reset is pushed.
- Will play songs written for Alf synthesizer. (Alf software will not take advantage of all the features of this board. Their software sounds the same on our synthesizer.)
- Whole through 64th notes, rests, which can be dotted, triplet or tied.
- Key: 0 to 7 flats or sharps.
- Accidentals: sharp, flat, and natural; double sharps/flats converted to natural form.
- 12 simultaneous tones with 4 percussive sounds.
- Play speed controlled by game paddle.
- Game paddle inputs during Compose to input pitch, length, accidentals, cursor movements, insert and delete.
- Keyboard inputs: envelope (attack, volume, release, sustain, gap, noise, quarter length)  
disk (load, save, play)  
editing (new, voice, subroutine, title, key, measure, time, transpose, position, delete)
- Pitch range: C two octaves below middle-C to E two octaves above middle-C.
- User friendly by handholding when errors are encountered.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- RCA - type standard audio output jacks for connection to stereo amplifier or headphones.
- All connecting cables are provided.
- Requires Apple IIe or II+ (48 K minimum) with one disk drive.

**Price: \$159.00**

Texas residents add 5% sales tax

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# APPLIED ENGINEERING

## 8 BIT 8 CHANNEL A/D SYSTEM FOR THE APPLE

### Features:

- 8 Bit Resolution
- On Board Memory
- No Missed Codes Over Full Temperature Range
- Ratiometric Capability
- Fast Conversion (.078 ms per channel)
- Eliminates The Need To Wait For A/D Conversion (just peek at data)
- A/D Process Totally Transparent To Apple (looks like memory)
- Low Cost

The APPLIED ENGINEERING A/D BOARD is an 8 bit, 8 channel, memory buffered, data acquisition system. It consists of an 8 bit successive approximation A/D converter, an 8 channel multiplexer and 8 x 8 random access memory.

The analog to digital conversion takes place on a continuous, channel sequencing basis. Data is automatically transferred to on board memory at the end of each conversion. No A/D converter could be easier to use.

Our A/D board comes standard with 0, 10V full scale inputs. These inputs can easily be changed by the user to 0, -10V or -5V, +5V or other ranges.

The user connector has +12 and -12 volts on it, so you can power your sensors. (These power sources can be turned off with on-board dip switch.)

### Specifications:

Accuracy	0.4%
Analog Input Resistance	20K Ohms Typ.
Power Requirements	5V @ 3ma, -12V @ 10ma, +12V @ 6 ma
Maximum Voltage On Inputs	±17 Volts
Operating Temperature	0 to +70° C
Absolute Value of Full Scale Range	5 to 15 Volts

APPLIED ENGINEERING is a leading manufacturer of Apple peripherals. We believe in the Apple and see it as a good way of getting things done. APPLIED ENGINEERING'S A/D BOARD is a breakthrough product for Apple II owners, giving you real world data at a very affordable price.

A few applications may include the monitoring of • temperature • humidity • wind speed • wind direction • light intensity • pressure • RPM • soil moisture and many more.

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PRICE \$129.00  
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# 12 BIT, 16 CHANNEL PROGRAMMABLE GAIN A/D

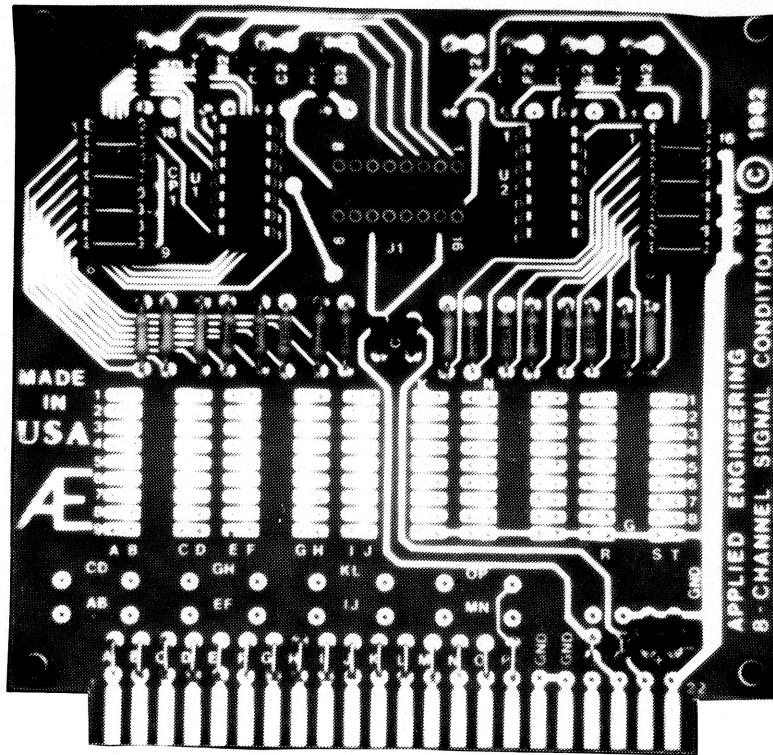
- All new 1984 design incorporates the latest in state-of-the-art I.C. technologies.
- Complete 12 bit A/D converter with the accuracy of 0.03%.
- 16 input channels.
- 9 software programmable full scale ranges, any of the 16 channels can have any range at any time. Under program control, you can select any of the following ranges: +/-10 volts, +/-5V, +/-2.5V, +/-1.0V, +/-500mV, +/-250mV, +/-100mV, +/-50mV, or +/-25mV.
- Very fast conversion (25 micro seconds).
- Analog input resistance greater than 1,000,000 ohms.
- LASER-trimmed scaling resistors
- Low power consumption through the user of CMOS devices.
- The user connector has +12 and -12 volts on it so you can power your sensors.
- Only elementary programming is required to use the A/D.
- Input filtering for all 16 channels can filter out any frequency over a value you select, from 2HZ to 100,000 KHZ.
- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes several sample programs on disk.

**Price \$319.00**

Our latest A/D card features true 12 bit resolution and data acquisition rates of up to 40,000 samples per second, 16 input channels and 9 software programmable gains. The AE 12 bit A/D easily out performs the competition.

A few applications may include the monitoring of flow, temperature, humidity, wind speed, wind direction, light intensity, pressure, RPM, soil moisture, and many more.

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Our 8 channel signal conditioner is designed for use with our A/D converter. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example: an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

The signal conditioner's outputs are on a high quality 16 pin gold I.C. socket that matches the one on the A/D so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

#### FEATURES

4.5" square for standard card cage and 4 mounting holes for standard mounting.

22 pin .156 spacing edge card input connector (extra connectors are easily available i.e. Radio Shack).

Large bread board area.

Uses F.E.T. op-amps for an input impedance of 10,000,000,000 ohms.

Full detailed schematic included.

All gains and offsets are programmed with easily constructed plug in component platforms. (Two blank platforms included.)

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VERY SIMPLE TO PROGRAM, JUST PEEK AT THE DATA.

+5 VOLTS & GND ARE PROVIDED ON TWO PINS OF THE DIP SOCKET FOR MINIMUM VOLTAGE DROP.

4 OTHER OUTPUTS ARE ALSO PROVIDED. USER 1 FROM PIN 39 ON APPLE BUSS, RESET FROM PIN 31, INTERRUPT REQUEST FROM PIN 30, NON-MASKABLE INTERRUPT FROM PIN 29. (THESE INPUTS ARE EQUIPPED WITH SOLDER SWITCHES IN CASE HAVING THESE INPUTS ON THE DIP CONNECTOR WOULD BE UNDESIRABLE.)

#### GENERAL

THE APPLIED ENGINEERING SUPER INPUT/OUTPUT BOARD IS A VERY UNIQUE INTERFACE FOR YOUR APPLE. NOW ON ONE CARD, YOU CAN HAVE 8 INPUTS AND 8 OUTPUTS EACH WITH ITS OWN CONNECTOR. THE SUPER INPUT/OUTPUT BOARD IS YOUR BEST CHOICE FOR ANY CONTROL APPLICATION. IF YOU'VE BEEN LIMITED BY THE I/O CAPABILITIES OF THE GAME CONNECTOR OR IF YOU FIND WIRING TO THE GAME CONNECTOR DIFFICULT, THIS INTERFACE IS FOR YOU.

THE SUPER INPUT/OUTPUT BOARD MANUAL INCLUDES MANY PROGRAMS FOR INPUTS AND OUTPUTS. A DETAILED SCHEMATIC IS INCLUDED.

SOME OF ITS APPLICATIONS INCLUDE:

PRINTER OUTPUT PORT

BURGLAR ALARM

DIRECTION SENSING

DRILL AND PRACTICE PROGRAMS FOR MANY STUDENTS

USE WITH RELAYS TO TURN ON LIGHTS, SOUND BUZZERS, START MOTORS, CONTROL TAPE RECORDERS AND PRINTERS

USE WITH DIGITAL JOYSTICK

ONLY \$ 69.00 ASSEMBLED AND TESTED

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CREDIT CARD NUMBER: \_\_\_\_\_

EXPIRATION DATE: \_\_\_\_\_      SIGNATURE: \_\_\_\_\_  
(as on card)

QTY	PRICE EACH	DESCRIPTION	TOTAL
SUB TOTAL			
TEXAS RESIDENTS ADD 5 1/8%			
TOTAL			