APPLIED ENGINEERING

APPLE PERIPHERALS

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Why Are Apple Owners So Loyal?

People who have the best often are, but in the case of Apple there's more. Apple owners think back to how Apple got started in 1977, just two people working out of a garage and what happened is the talk of Wall Street and the computer industry as well. Many like the fact that Apple only makes computers. Unlike their competition, they don't make typewriters, copiers or telephones. They do just one thing and that's one reason they do it so well.

At Applied Engineering we think the same way. You see, Applied Engineering is the only major hardware manufacturer totally dedicated to the Apple computer. Whereas most of our competitors must divide their time between IBM, Atari, Radio Shack or other computers, our engineers only design products for the Apple. This dedication allows us to be much more familiar with the Apple and those who use them.

We don't expect you to buy an Applied Engineering peripheral on loyalty alone, but when you compare our products to those made by QUADRAM, MICROSOFT, AST and others you'll find out why Applied Engineering means a quality design, innovation, craftsmanship and total Apple compatibility.

The other guys do pretty well considering how busy they are with IBM. But at Applied Engineering, ALL of our work involves the Apple. In fact, all of our employees were Apple owners before they came to work for us. The people in shipping, engineering, quality control and order entry all use Apples at work and at home.

This one track mindedness of ours allows us to offer the largest storage with Appleworks and Supercalc and our Z-80 card now includes the new 4.0 operating system. We can expand the Apple IIe to over 16 MEGABYTES of memory and the IIc to 512K, we've got clock cards, music cards, A to D converters, digital controllers, and a BSR system so your Apple can control your whole house with no additional wiring!

Applied Engineering recognizes that we've got to do a better job than our IBM counterparts because we know you're smarter than the average computer buyer, you bought an Apple. You see, our competition has it a little easier, their customers aren't as smart as you. After all, they bought the wrong computer.

So if you need more memory, or 80 columns, or RGB color, or double hi res graphics, if you want to know the time and temperature or other "real world" conditions, if you'd like to run CP/M software, have a RAM disk, increase the storage of Appleworks or Visicalc, if you want your Apple to play music, talk and sing, if you'd like your Apple to control the lights and appliances in your house, then do what NASA does, what Steve Wozniak does, what Ford does, what the U.S. Government, Hughes Aircraft, Honeywell, Westinghouse, AT&T, and even what Apple computer does, call Applied Engineering. Then you will discover what thousands of companies and over a hundred thousand Apple owners already know, that you can be smart and loyal all at the same time.

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We Set the Standard
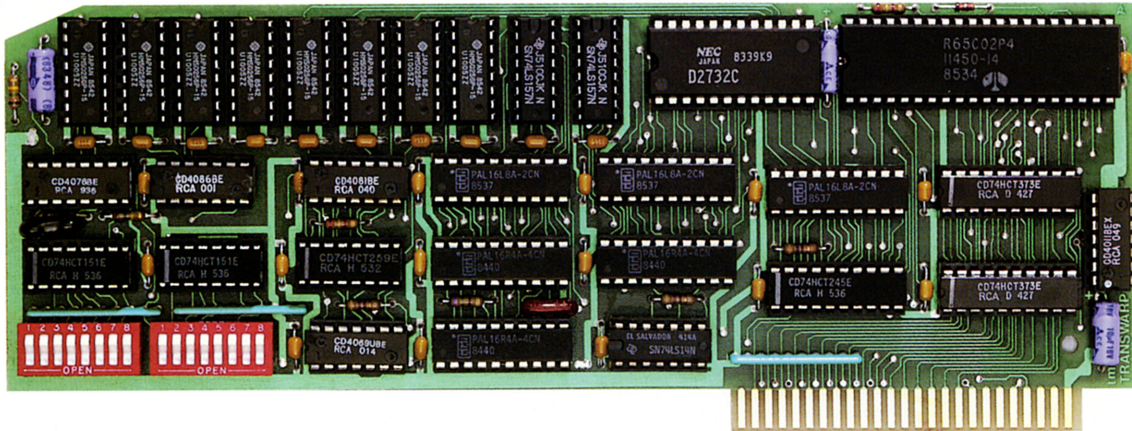
TransWarp™. The fastest accelerator you can buy for your Apple™ IIe, II, or II+

Computing at warp speed!

It's an experience you shouldn't miss. And with TransWarp, you won't have to. Because TransWarp will run your software up to *3.6 times faster* — leaving other accelerators in the stardust!

No more yawning while your Apple™ slowly re-arranges text or calculates spreadsheets. With 256K of ultra-fast RAM, TransWarp speeds up *all* Apple software — including AppleWorks, Supercalc 3a, Visicalc and all educational software, graphics and games. And it's compatible with all standard peripheral cards (such as RamWorks II and Apple memory cards), Profile and Sider hard disks, 3½″ UniDisks, 80-column cards, modems, clock cards, mouses and more! You name it, TransWarp accelerates it. There's even a 16 bit upgrade chip available should 16 bit software become available for the Apple.

An important difference

Only TransWarp accelerates your Apple's main memory, ROM *and auxiliary memory.* And with more and more programs residing in auxiliary memory, buying anyone else's accelerator makes less and less sense. TransWarp even works with most D.M.A. devices including the Swyft™ card.

There's one more difference. Since TransWarp doesn't use memory caching, it accelerates *all* software — and not just most of it.

A cinch to use

Simply plug TransWarp into any slot in your Apple II, II+ or IIe — including slot 3 in the IIe.

Instantly you'll be computing at speeds you only dreamed about before. And should you ever wish to run at normal speed, simply press the ESC key while turning your Apple on.

Since TransWarp is completely transparent, you won't need pre-boot disks or special software. It's ready to go right out of the package!

Speed = Productivity

Imagine the productivity gains you'll achieve when your programs are running over three times faster. TransWarp is so powerful, your Apple will make IBM PCs™ and even ATs™ look like slowpokes — whether you're planning taxes, plotting charts or playing games! Take a look at a few of the features that set TransWarp apart:

• 3.6 MHZ 65C02

• 256K of ultra-fast on-board RAM

• Accelerates main *and* auxiliary memory

• Low power consumption for cool operation

• Totally transparent operation with all software

• Plugs into any slot, including slot 3 on the Apple IIe

• Accelerated 16 bit option available

TransWarp Accelerator **$279**
16 bit upgrade (may add later) **$89**

COMPATIBLE WITH IIe and II+
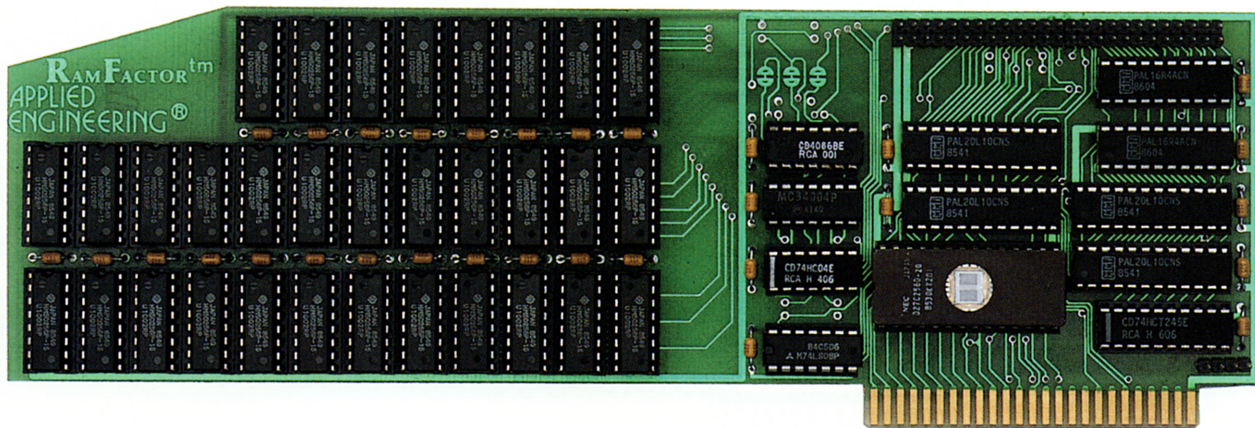
All the performance, speed, and software compatibility of RamWorks™ in a slot 1 through 7 card

That's right! Now Applied Engineering offers you a choice. While RamWorks is the clear winner for the auxiliary slot in a IIe, RamFactor is the standard for slots 1 through 7. Now anyone with an Apple II+, Franklin, or Apple IIe preferring to use slots 1 through 7 can now enjoy the speed and performance that until now was only available with RamWorks.

With RamFactor, you'll be able to instantly add another 256K, 512K, or a full 1 meg on the main board and up to 16 meg with additional piggyback card. And since virtually all software is automatically compatible with RamFactor, you'll immediately be able to load programs into RamFactor for instantaneous access to information. You'll also be able to store more data for larger word processing documents, bigger data bases, and expanded spreadsheets.

Very Compatible

All the leading software is already compatible with RamFactor. Programs like AppleWorks, Pinpoint, BPI, Managing Your Money, Dollars and Sense, SuperCalc 3A, PFS, MouseWrite, MouseDesk, MouseCalc, Sensible Speller, Applewriter IIe, Business Works, ReportWorks, Catalyst 3.0 and more. And RamFactor is fully ProDos, Dos 3.3, Pascal 1.3 and CP/M compatible. In fact, no other memory card (RamWorks excepted) is more compatible with commercial software.

AppleWorks Power

There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and the date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", and hard disks. All this performance is available to anyone with an Apple IIe *or* II+ with an 80 column card. RamFactor, no other standard slot card comes close to enhancing AppleWorks so much.

True 65C816 16 Bit Power

RamFactor has a built-in 65C816 CPU port for direct connection to our IIe 65C816 card for linearly addressing up to 16 meg for the most powerful 16 bit applications. (II+ 65C816 card under development).

Powerful Program Switcher

With RamFactor, you can organize memory into multiple work areas and switch between them. Each work area can contain different programs and even different operating systems. And with our Battery Back-up option, you can have permanent storage for up to 20 years.

FEATURES:

- Up to 16 meg total memory, 256K to 1 meg on main board. Up to 16 meg with additional memory on piggyback card.
- Fully Apple II Memory Expansion compatible
- Compatible with Apple IIe, II+ and Franklin
- Battery back-up option allows you to turn on your Apple and run your favorite programs in less than 1 second!
- Automatically recognized by ProDos, DOS 3.3, Pascal and CP/M
- Built-in RamDrive™ software
- Built-in linear addressing 16 bit co-processor port
- Built-in self diagnostic software
- Automatic expansion with AppleWorks 1.3 or later
- Allows Apple II+ and IIe to run your AppleWorks without buying additional software
- Accelerates AppleWorks
- Fits any I/O slot except slot 3
- Fully socketed and user upgradeable
- Much, much more

RamFactor with 256K	**$239**
RamFactor with 512K	**$289**
RamFactor with 1 MEG	**$389**
RamFactor with 2-16 MEG	**CALL**
Battery Back-up Option	**$179**
65C816 16 Bit Card	**$159**
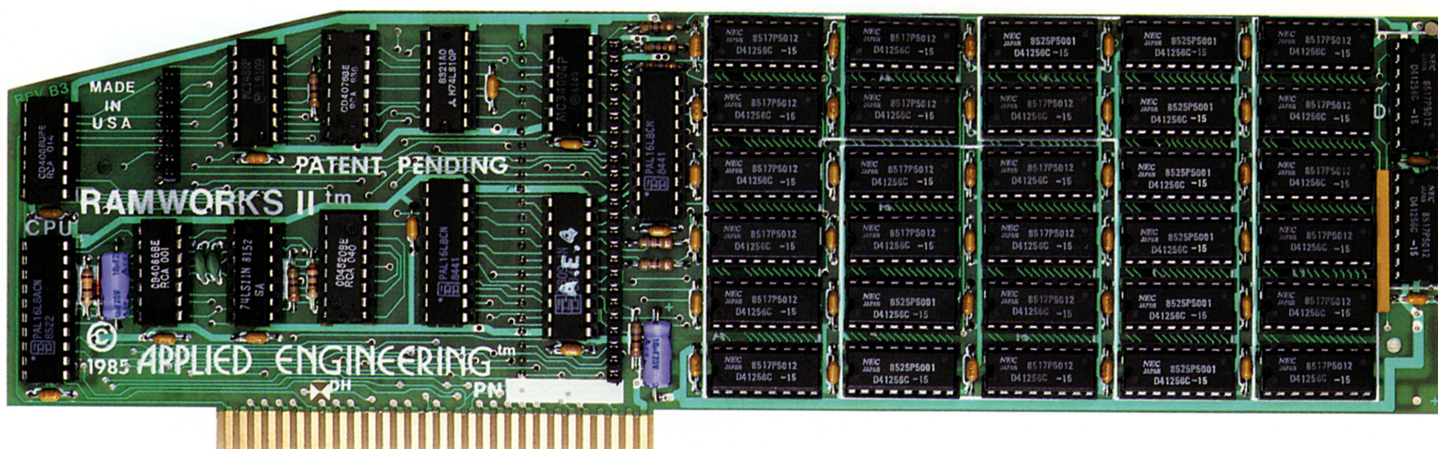
The best selling, most compatible, most recommended, most expandable card available

64K to 16 Meg! RamWorks II® is Number One

Applied Engineering has solved the most common problem that computer owners have—running out of memory. RamWorks II™ is the perfect solution because it offers the widest and biggest memory sizes available anywhere.

RamWorks II—A card that plugs into the Apple IIe auxiliary slot and functions EXACTLY like Apple's extended 80 column card (in fact, a 256K RamWorks II actually costs less than Apple's 64K extended card) but with RamWorks II you get more memory, 80 column text, a 5 year warranty and most importantly, room to grow without using more slots. A design so advanced there's a patent on it. If you have an IBM, we suggest you do what everybody does, trade it in on a IIe.

With the included RamDrive™ software, RamWorks II can also be used as an ultra high speed RAM disk. Depending on the memory size of the RamWorks II card, you can emulate up to 4 disk drives with one RamWorks II card. All at about 20 times faster than mechanical floppy drives and about 5 times faster than a hard disk.

RamWorks II can be used as a solid state disk with DOS 3.3, PASCAL, CP/M and PRO-DOS (up to 5,700 blocks free)!

RamWorks II can be purchased in a wide range of sizes and is user upgradeable using either 64K RAMS or the new 256K RAMS. If you already have an extended 80 column card, no problem. Just unplug the 64K RAMS and plug them into the RamWorks II for an additional 64K. An RGB option is also available, you can order it with your RamWorks II card or add it on at a later date.

RamWorks II saves you time, money, slots and hassle. You'll have additional memory NOW and in the future.

The AppleWorks Amplifier

While RamWorks II is recognized by all memory intensive programs, NO other expansion card (RamFactor excepted) comes close to offering the multitude of enhancements to AppleWorks that RamWorks II does. Naturally, you'd expect RamWorks II to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K in AppleWorks and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Just look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks II does. With a 256K or larger RamWorks II, all of AppleWorks will automatically load itself into RAM dramatically increasing speed by eliminating all the time required to access the program disk drive. Now switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

Only RamWorks II eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 15,000. *Only* RamWorks II increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks II (256K or larger) offers a built-in buffer, so you won't have to wait for your printer to stop before returning to AppleWorks. RamWorks II even expands the clipboard. And auto segments large files so they can be saved on two or more disks.

RamWorks II, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available

Using RamWorks II couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card (RamFactor excepted). Popular programs like AppleWorks, Pinpoint, Catalyst, Mouse-Desk, HowardSoft, FlashCalc, The Spread Sheet, Managing Your Money, SuperCalc 3a, and MagiCalc to name a few (and *all* hardware add on's like ProFile and Sider hard disks). RamWorks II is even compatible with software written for Apple cards. But unlike other cards, RamWorks II plugs into the IIe auxiliary slot providing our super sharp 80 column text in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

512K Expander
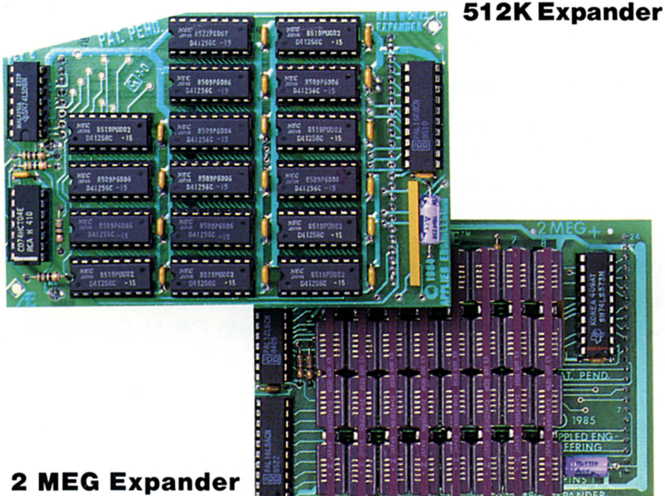
2 MEG Expander

Should you ever run low on memory with Ram-Works II (unlikely) you can add these expander cards to your RamWorks II at any time. And of course, the above expander cards are compatible with the original RamWorks too.

It's Popular

Popularity translates into great software support because software companies can't support all RAM cards, they can only support the ones their customers are likely to own. And software companies appreciate the fact that when they write software for RamWorks II in the IIe, they're also writing software for our memory expansion card for the IIc, Z-RAM. And our customer list reads like the Who's Who of Apple computing with just about every software company in the land buying one, including Apple Computer.

It's Reasonable

Applied Engineering's years of experience and wide product line really pays off, and because of our high sales levels we buy most of our I.C. chips factory

direct. So don't let our low prices fool you, they're caused by high volume production. That's why we can offer the most memory for the least money.

IBM Output

Apple Output
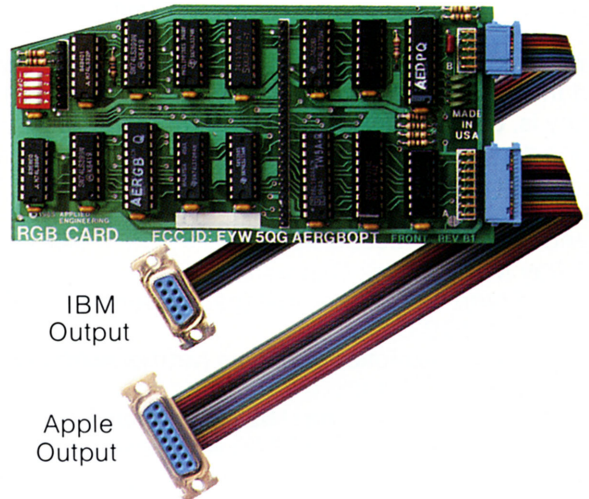
It's In Color

The same slot that's used for memory expansion is also the slot that's used for RGB color display. RamWorks II lets you decide later to add RGB color. For only $129, an RGB option can be added to RamWorks II to give you double high resolution color graphics and 80 column text. All with razor sharp, vivid brilliance that's unsurpassed in the industry. The RGB option does not waste another valuable slot, but rather plugs into the back of RamWorks II with no slot 1 interference (works on the original RamWorks too).
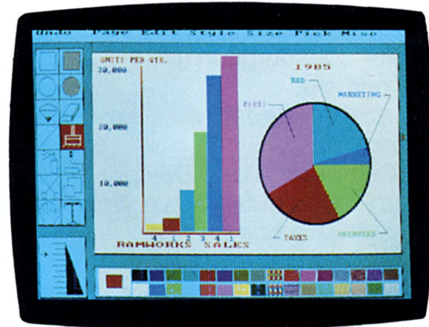
You'll appreciate the multiple text colors (others only have green) that come standard. But the Ram-Works II RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software.With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks II RGB option provides both Apple standard and IBM standard outputs (cables included). And remember, you can order the RGB option with your RamWorks II or add it on at a later date.

It Corrects Mistakes

Let's say you bought some other RAM card (and that's a mistake) and your RAM card is not being recognized by Appleworks, Advanced VisiCalc, Flash-Calc, Supercalc 3A, or other programs and you want RamWorks II. No problem. The memory chips on the card that you have now, which is where most of the money is, can be unplugged and then plugged into the expansion sockets on RamWorks II.

It's Got It All

- 15 Day Money Back Guarantee
- Super Sharp 80 Column Text (patent pending) with or without RGB option
- Double high resolution graphics (with or without RGB option)
- Expandable up to 1 Meg (1024K) on main board
- Expandable to 16 Meg (3072K) with expander (piggy-back) card
- Can use 64K or 256K RAMS in any combination
- Linear Addressing Co-Processor Port
- Automatic AppleWorks Expansion up to 2275K desktop
- Accelerates AppleWorks
- Built-in AppleWorks printer buffer
- The only large RAM card that's 100% Compatible with All IIe Software
- RamDrive, the ultimate disk emulator software, included free
- Compatible, RGB option featuring ultra high resolution color graphics and multiple text colors, with cables for both Apple and IBM type monitors
- Built-in self-diagnostic software
- No slot 1 interference
- Lowest power consumption (patent pending)
- Takes only one slot
- Software industry standard
- 16 bit option
- Advanced Computer Aided Design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- 5 year no hassle warranty
- Displays date and time on the AppleWorks screen with any PRO-DOS compatible clock
- Much, much more!

RamWorks II with 64K	$179
RamWorks II with 256K	$219
RamWorks II with 512K	$269
RamWorks II with 1 MEG	$369
RamWorks II with 1.5 MEG	$539
RamWorks II with 3 MEG	$1599
RGB Option (can be added later)	$129
16 Bit Option, 65C802 (can be added later)	$89
16 Bit Option, 65C816 (can be added later)	$159

LOW COST SOFTWARE OPTIONS
RamDrive™ (now included FREE!)

RamDrive will give you a high speed solid state disk drive. The RamDrive 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 RamWorks II, RamDrive will act as half a disk drive. If you have a 128K RamWorks II, Ram Drive will act as a full disk drive. As you go past 128K of memory, RamWorks II will act as multiple disks, so all one megabyte can be as a solid state disk. Either way, your programs will load and save over 20 times faster. RamDrive is compatible with APPLESOFT, PRO-DOS and DOS 3.3. The disk also includes a high speed RAM copying program. RamDrive is another disk drive only 20 times faster and no whirring, clicking or waiting!

CP/M RamDrive™

CP/M RamDrive is just like RamDrive, only for CP/M. CP/M RamDrive runs on any Z-80 card that runs standard CP/M, i.e. Applied Engineering Z-80 Plus, Microsoft Soft Card or PCPI. CP/M RamDrive 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, Wordstar and Turbo Pascal becomes virtually instantaneous when used with CP/M RamDrive.

$29

VC IIe Expander

VC IIe Expander gives owners of Visicalc IIe and Advanced Visicalc IIe increased storage. When used with VC IIe you'll get 141K workspace (128K Ram-Works II or larger required). When used with Advanced VC IIe you'll get a 131K with a 128K RamWorks II, 253K with a 256K RamWorks II and 437K with a 512K RamWorks II.

$29

Many of the features and benefits of RamWorks II and RamFactor are the same; however, there are differences that we would like to point out so that you can make the best choice.

Most importantly, RamWorks II is specifically designed for the Apple IIe. RamWorks II will not work in a II+, Franklin, or other compatible. RamFactor is compatible with the IIe, II+, II, Franklin, and most compatibles.

Both cards are equally compatible with commercially prepared programs. However, RamWorks offers more power with AppleWorks but RamFactor can be battery backed-up in smaller sizes. If your primary application is AppleWorks and you have a IIe, you may prefer RamWorks. But if you prefer to use slots 1-7, RamFactor would be the better choice. Both products are so good you'll be happy no matter which one you choose.

	RamWorks®	RamFactor™
Maximum memory on main card	1 meg	1 meg
Expander cards (for expansion beyond 1 MEG)	512K, 2 meg, 4 meg, 16 meg	4 meg, 16 meg
Slot	Auxiliary Slot	Slots 1-7 except 3
Ram Disk	Disk Based	Eprom Based
Software standard	Yes	Yes
Battery back-up	On 4 and 16 meg expander, memory on main RamWorks is not backed-up	All memory can be battery backed-up
AppleWorks compatibility	All versions	Versions 1.3 or later
Maximum number of records in data base	15,200	5,300
Maximum number of lines in word processor	15,200	5,300
Autoloads AppleWorks	YES	YES
Displays time on screen with Pro-Dos clock	YES	YES
Auto-segments large files	YES	YES
Fully socketed and user upgradeable	YES	YES
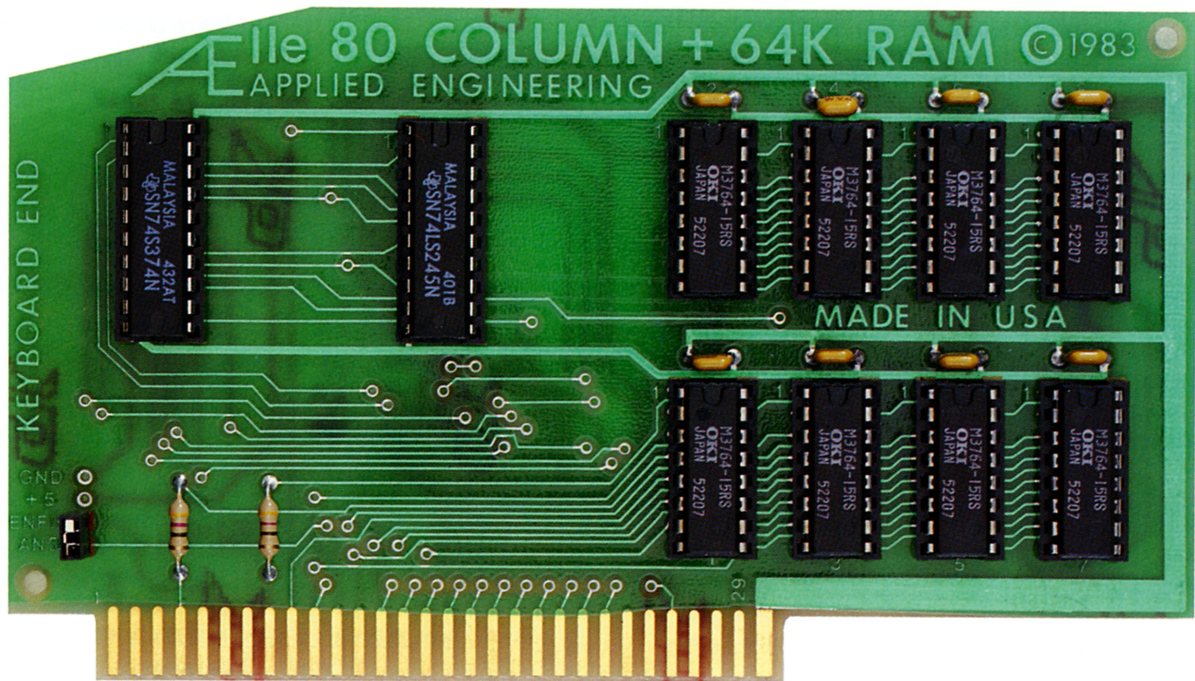
FEATURES

- Plugs into the Apple IIe auxiliary slot and functions EXACTLY like Apple's Extended 80 Column Card

- Expands your Apple IIe to 128K memory

- Provides an 80 column text display

- Compatible with Apple IIe 80 column and extended 80 column card software

- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (will act as half a drive)

- Permits your IIe to use the new double high resolution graphics

- Automatically expands Appleworks to 55K available

- Automatically expands Visicalc to 95K storage in 80 columns!

- PRO-DOS will use the A.E. Extended 80 Column Card as a high speed disk drive

- Documentation included, we show you how to use all 128K

- 5-year "no hassle" warranty

$99
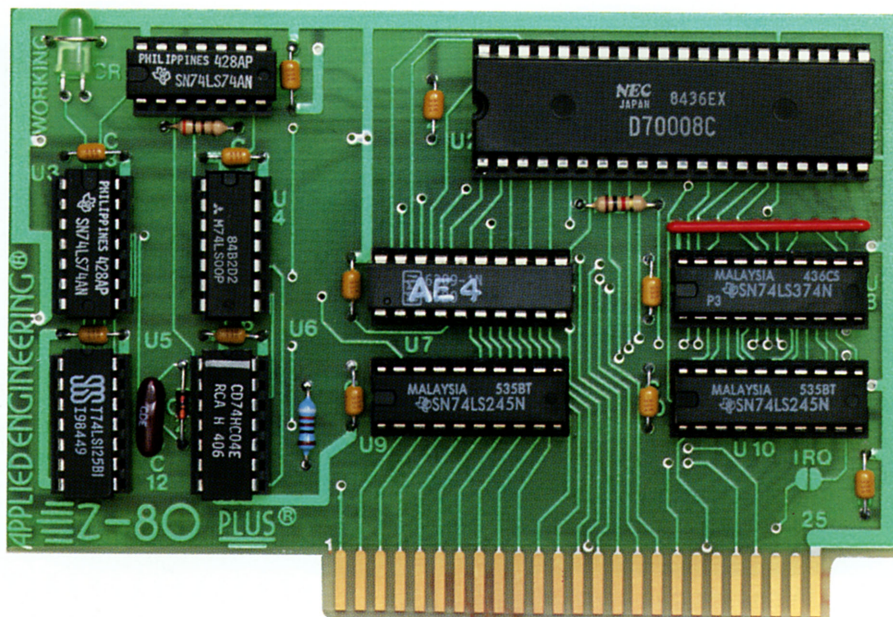
Enter the CP/M world with the new Z-80 Plus card from Applied Engineering and introduce your Apple to thousands of new programs. Only the Z-80 Plus comes standard with the new 4.0 software, the most advanced system for running CP/M programs ever. Only CP/AM 4.0™ has advanced features like built-in disk emulation for popular memory expansion boards (those made by Apple and Applied Engineering and others) to give you a faster system with more storage. You also get menu driven utilities that are much easier to use than the older CP/M utilities so you can get down to all that great CP/M software faster. Each Z-80 Plus card comes complete with CP/M manual, 4.0 operating system and advanced utilities on disk. The Z-80 Plus runs older CP/M programs too, down to Version 1.6 (2.2 is the most popular). With the Z-80 Plus you can run the largest body of software in existence and the Z-80 Plus is the only card on the market capable of accessing more than 64K in an Apple IIe. If you have an extended 80 column card, all 128K is usable, and if you have RamWorks, up to 1088K is available to CP/M. And each Z-80 Plus includes our CP/M RAM Drive software, enabling IIe owners to use an extended 80 column card, or a RamWorks card as an ultra-fast RAM disk enabling CP/M software to run 10 to 20 times faster. So fast acting software like WordStar and dBASE II become virtually instantaneous. Simply plug the Z-80 Plus into any slot in your Apple. You'll have two computers in one and the advantages of both, all at an unbelievably low price.

FEATURES

- Totally compatible with all CP/M software
- Fully compatible with Microsoft disks (no pre-boot required as with others)

- Executes the full Z-80, 8080 and 8085 instruction set
- 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 through CP/M programs at a very low power level
- The Z-80 Plus can access up to 1088K of memory (most programs only need 48K)
- 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, Turbo Pascal, Cobol-80, Fortran-80, Peachtree and ALL other CP/M based software
- Fast Clock: 4MHZ (Z-80B)
- Documentation included
- High quality P.C. board, gold plated connector, all I.C.'s in high quality sockets, with mil. spec. components used throughout
- Compatible with Apple II, II+ and IIe
- Five 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.

VISA **MasterCard** **and C.O.D. 214/241-6060** **$139**
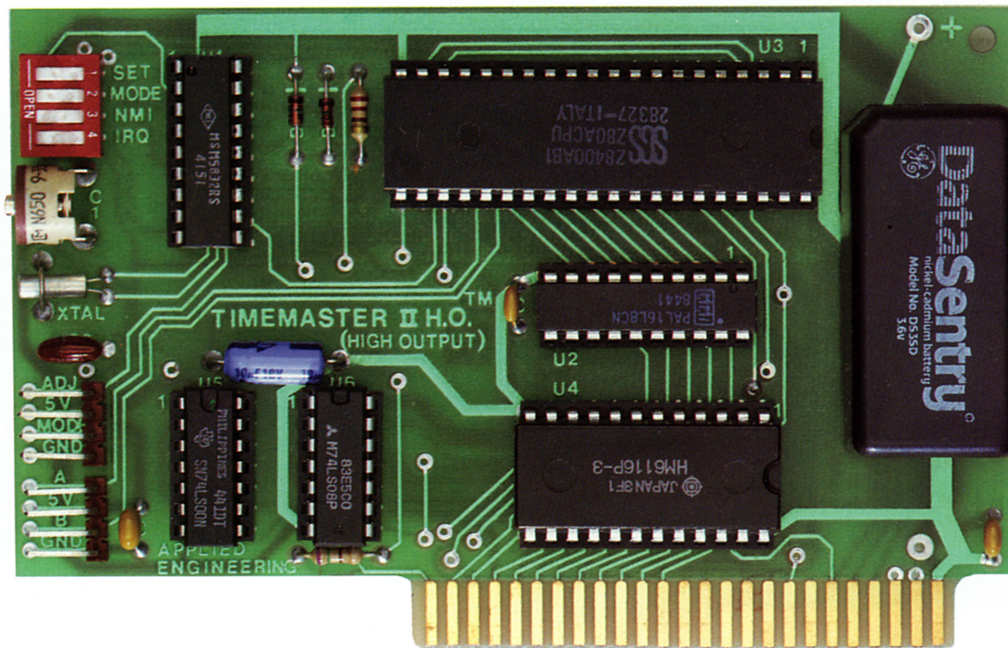
FEATURES

- The only clock that displays the date and time on the Appleworks screen

- 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 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)

- The only card recognized by both the DOS 3.3. and PRO-DOS versions of AppleWriter IIe

- 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

- Accuracy 0.00005%

- High quality P.C. board, gold plated connector, all I.C.'s in high quality sockets, with mil. spec. components used throughout

- Five year warranty

- Auto Recharging nickel-cadmium battery will last over 20 years

Only the Timemaster H.O. displays the date and time on the Appleworks screen.

	PRO-DOS COMPATIBLE	INCLUDES DOS DATER	MILLISECOND TIME	YEAR DATA	LARGEST SAMPLE SOFTWARE	REMOTE SET PORT	BSR PORT	EMULATES ALL OTHER CLOCKS
H.O	YES	YES	YES	YES	YES	YES	YES	YES
BRAND A	NO	NO	YES	NO	NO	NO	NO	NO
BRAND C	NO	NO	NO	NO	NO	NO	NO	NO
BRAND M	NO	NO	NO	NO	NO	NO	NO	NO
BRAND P	YES	YES	NO	YES	NO	NO	NO	NO
BRAND S	NO	NO	NO	YES	NO	NO	NO	NO
BRAND T	YES	NO	NO	NO	NO	NO	YES	NO

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 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 can emulate us.

The Timemaster 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 who bought some other clock card. In fact, you could put ALL the competitive cards in every slot in your Apple and you still wouldn't have all the features of the Timemaster H.O.

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

The Timemaster H.O. comes with a ton of fun and useful software. It has an easy-to-read yet detailed manual, a 20 year auto-recharging battery and a 3 year no hassle warranty.

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. In fact, we provide more sample software than all the competition combined. Hobbyist take note: Most of the machine code programs come with their source code on disk. In Pascal, the H.O. will update the filer 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 Appleworks (only the Timemaster H.O. displays the date and time on the Appleworks screen), Catalyst IIe, Super-Calc 3A, 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).
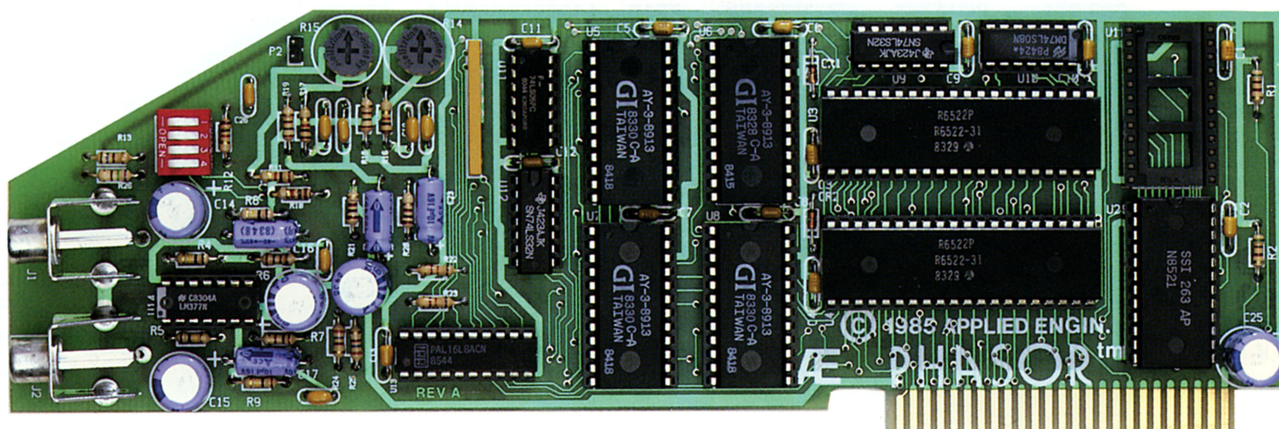
Is the Timemaster II H.O. a simple, easy to use clock for beginners? Or a sophisticated, high performance peripheral for the experienced? The answer is "YES". And when you think about it, aren't those two products the one you need now?

BSR Option (may be added later) $49
Timemaster H.O................................. **$129**

VISA MasterCard **and C.O.D. 214/241-6060**

COMPATIBLE WITH IIe and II+

PHASOR - For the thunderous, booming power you so desperately need

Phasor is a complete high performance stereo music, sound and speech synthesizer for the Apple IIe and II+. Phasor offers 12 musical and sound effects voices (channels) and 4 white noise generators for percussive sounds. Phasor also gives your Apple the power of uncanny speech, with its unlimited vocabulary speech synthesizer.

What makes Phasor so desirable is not just that it offers the very best in both sound and speech, but the fact that Phasor automatically enhances and is recognized by more off the shelf hardware than any other sound card. Phasor works with ANY program that works with ANY sound card. Programs written for the Mockingboard™, the ALF music card, Synphonix™ and the Super Music Synthesizer actually sound better on Phasor. In fact, Phasor has twice the accuracy and 4 times the output power of the nearest competitor. Phasor adds exciting pulse pounding sound to all of the better games like Skyfox, Under Fire, Willy Byte, Tactical Armor Command, Maze Craze, Zaxxon, Ultima IV; to name a few. Educational software like music construction set. Guitar Master and Music Star are greatly enhanced by Phasor's power. And a complete long list of compatible software is included with each Phasor.

But even if you don't own any software, Phasor comes with a ton of entering and educational software that will let you enjoy Phasor for a long, long time.

Phasor is an astonishing peripheral card that generates explosive sound effects, vibrant music and excellent speech from your Apple. It adds a new educational dimension of exciting sounds to games, educational programs, music programs and programs you create yourself.

FEATURES

- The most compatible sound card available. Fully Mockingboard™, ALF, and Super Music Synthesizer compatible but with many enhanced capabilities.

- 12 simultaneous sound channels, 4 white noise generators, 1 voice channel expandable to 2 voices.

- Easy to use "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.

- Included Software: Music Editor, Sound Effects Editor, Text to Speech, and over 30 songs and sound effects ready to run, not copy protected! ProDos based.

- Easy to program in Basic to generate speech and complex sound effects. Now your games can have explosions, phasor zaps, train whistles, death cries. You name it, this card can do it.

- Unlimited vocabulary voice.

- Simple commands adjust rate of speech, pitch, volume and more.

- Powerful 4 watt stereo amplifier for direct connection to any size speakers.

- Requires Apple IIe or II+ (64K minimum) with one disk drive.

- Software is RAM based when used with any standard RAM card for ultra-fast operation.

- No hassle 5 year warranty.

WARNING: Applied Engineering will not be responsible for shattered windows, cracks in plaster, or government personnel mistakenly thinking an alien attack is taking place in your neighborhood. Phasor is equipped with volume controls. Please keep them at the appropriate level. Thank you.

$179

COMPATIBLE WITH II+ and IIe
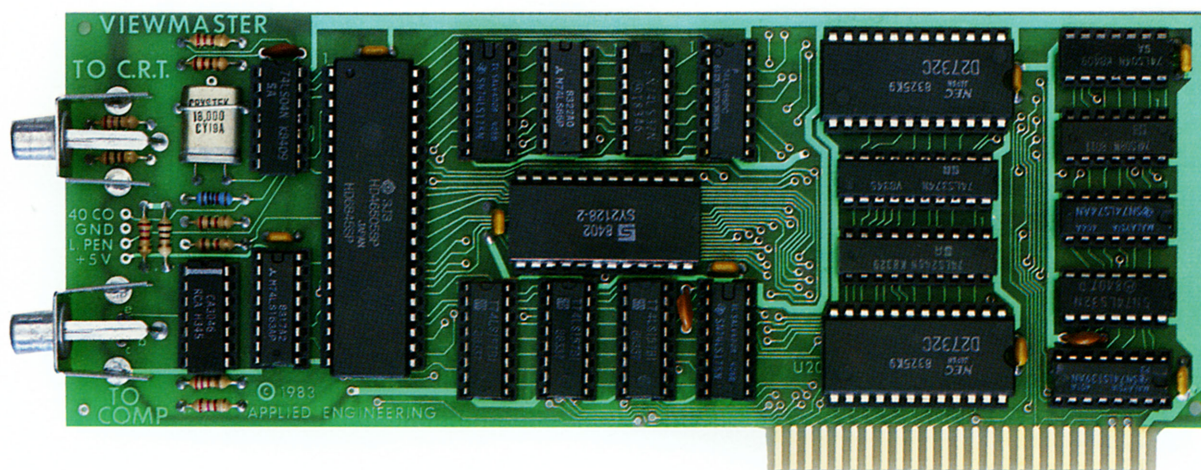
There used to be about a dozen 80 column cards for the Apple, Now There's Only ONE!

	PRICE	BUILT-IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7X9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER 80	**139**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD 80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION 80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX 80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	YES	YES	NO	YES	YES	NO	YES

FEATURES

- All new design
- 80 characters by 24 lines
- Fully compatible with all Apple languages and software
- Very sharp 7X9 character matrix with true descenders
- Highest compatibility with existing 80 column software
- Power and input connector for light pen
- Very low power consumption through the use of CMOS devices
- High speed (18 MHZ) scroll rate
- Upper and lower case characters with true descenders, both inverse and normal
- All on-screen editing functions are supported
- User defineable cursor shape
- Compatible with Apple II, II+ and IIe
- Five year warranty

TOTAL compatibility is the secret to the VIEWMASTER 80's great success. The VIEWMASTER 80 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.

Viewmaster 80 delivers a super sharp, state of the art display, with a 7x9 character matrix giving you a clear, easily readable character.

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 80. There are no options available for the VIEWMASTER 80 because every feature of every 80 column card is already in the VIEWMASTER 80. The VIEWMASTER 80 is compatible with the Apple II, II+, and Franklin computers.
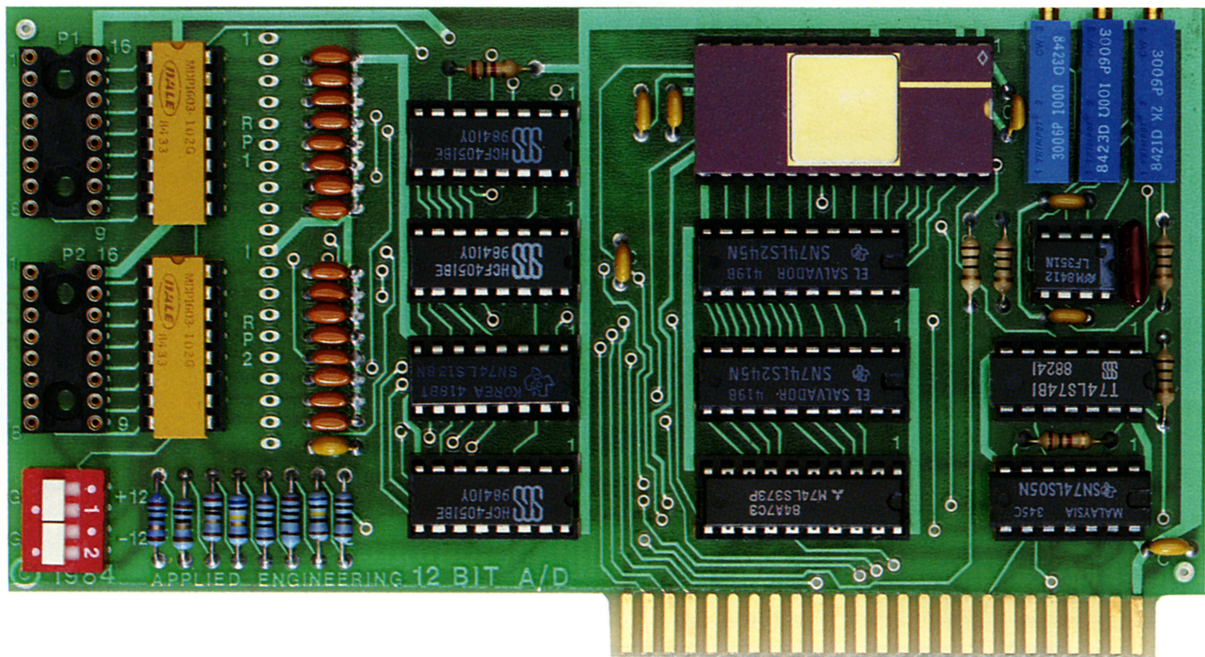
$139

VISA MasterCard **and C.O.D. 214/241-6060**

FEATURES

- All new 1984 design incorporates the latest in state-of-the-art I.C. technologies

- Complete 12 bit A/D converter with an 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

- Works in any slot including slot 3 in the IIe

- 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

- Systems include several sample programs on disk for BASIC and machine code including source code

- Works in any slot of a IIe or II+ including slot 3 of a IIe 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.
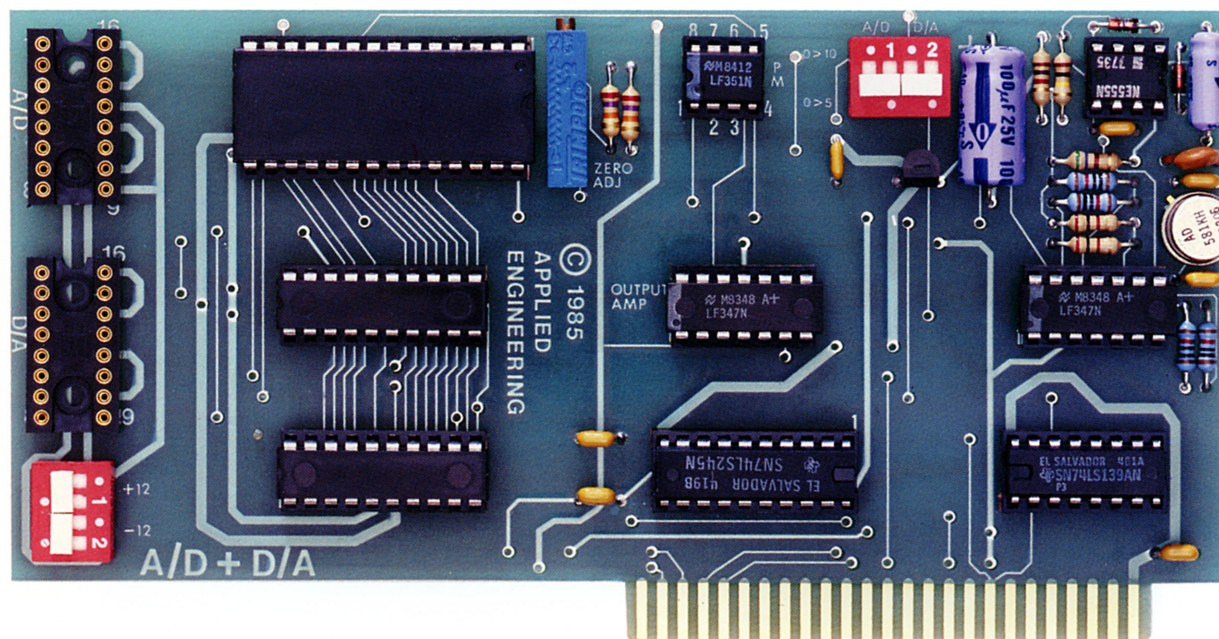
A few applications may include the monitoring of flow, temperature, humidity, wind speed, wind direction, light intensity, pressure, RPM, soil moisture, and many more.

$319

Commercial, industrial, and scientific data acquisition and control functions are now practical with Applied Engineering's A/D + D/A card.

A/D + D/A Features:

- Single PC card
- 8 channels A/D
- 8 channels D/A
- Superfast conversion time
- Very easy programming
- Many analog ranges
- Manual contains sample applications
- Works in any slot of a IIe or II+ including slot 3 of a IIe

A/D SPECIFICATIONS

- 8 channels
- 0.3% accuracy
- On board memory
- Fast conversion (.078 mS per channel)
- A/D process totally transparent to Apple (looks like memory)
- Eliminates the need to wait for A/D conversion (just peek at data)
- No missed codes over full temperature range
- 50K ohms analog input resistance
- User programmable input ranges are 0 to 10 volts, 0 to 5, −5 to +5, −2.5 to +2.5, −5 to 0, and −10 to 0.

The A/D section is a 8 bit, 8 channel memory buffered, data-acquisition system on a single Apple plug-in card. It consists of a high speed 8 bit successive approximation A/D converter, an 8 channel multiplexer, 8X8 dual-port RAM, and all necessary control logic. The A/D process takes place on a continuous, channel sequencing basis. Data is automatically transferred to its proper location in the on board RAM. No A/D converter could be easier to use.

D/A SPECIFICATIONS

- 8 channels
- 0.3% accuracy
- On board memory
- On board output buffer amps can drive 5 MA of output current
- No missing codes over full temperature range
- D/A process is totally transparent to the Apple (Just poke the data)
- Fast conversion (.003 mS per channel)
- User programmable output ranges are 0 to 5 volts and 0 to 10 volts.

The D/A section contains 8, 8 bit voltage output, digital to analog converters, with output buffer amplifiers and all interface logic on a single card. No trims are required to achieve the full specified performance. Separate on-card latches are provided for each of the eight D/A converters. No D/A converter could be easier to use. The on board amplifiers are laser-trimmed during manufacture, thereby eliminating any requirement for offset nulling.

A few applications may include the measurement and control of temperature, humidity, wind speed, wind direction, light intensity, pressure, RPM, soil moisture, process control, automatic test equipment and many more.

$199

VISA MasterCard **and C.O.D. 214/241-6060**

COMPATIBLE WITH IIe and II+

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)

$79

I/O 32

COMPATIBLE WITH IIe and II+

FEATURES

- Provides 4, 8-bit programmable I/O ports

- Any of the 4 ports can be programmed as an input or an output port

- All I/O lines are TTL (0-5 volt) compatible

- Your inputs can be anything from high speed logic to simple switches

- Programming is made very easy by powerful on-board firmware

- The I/O 32 is your best choice for any control application

- Manual includes many programs for inputs and outputs

Some applications include:
Burglar alarm, direction sensing, use with relays to turn on lights, sound buzzers, start motors, control tape recorders and printers, use with digital joystick.

The I/O 32 features twin 6821 PIAs (Programmable Interface Adaptors). However, unlike previous offerings from other companies, the I/O 32 has its own powerful on-board firmware. This on-board firmware makes your programming a snap from BASIC. Of course, if you want to control the I/O 32 directly you can.

So whether you're a beginning BASIC programmer or an expert at machine language programming, the I/O 32 is the perfect solution to any control application.

$89

VISA MasterCard **and C.O.D. 214/241-6060**

With today's advanced peripherals it's easy to overload the standard Apple power supply. Applied Engineering now offers a heavy duty 6000 MA Power Supply to fill the needs of today's power user.

The standard Apple power supply is rated at only 2500 MA. Use the chart below by adding up the peripherals in your Apple to determine if your system is overloaded.

DEVICE	MA's (apx)
Apple IIe (only)	1000
Apple II+ (only)	1500
5¼" disk interface	400
3½" disk interface	500
Hard disk interface	700
Typ. 1 Meg Ram card	1100
1 Meg RamWorks II	400
Accelerator	500
Clock card	200
CP/M card	300 - 1000
Modem	400 - 900
Printer interface	300 - 600

As you can see, it's easy to exceed the 2500 MA's that Apple's power supply can deliver. With Applied Engineering's heavy duty Power Supply you'll have over 6000 MA's available for even fully loaded Apples.
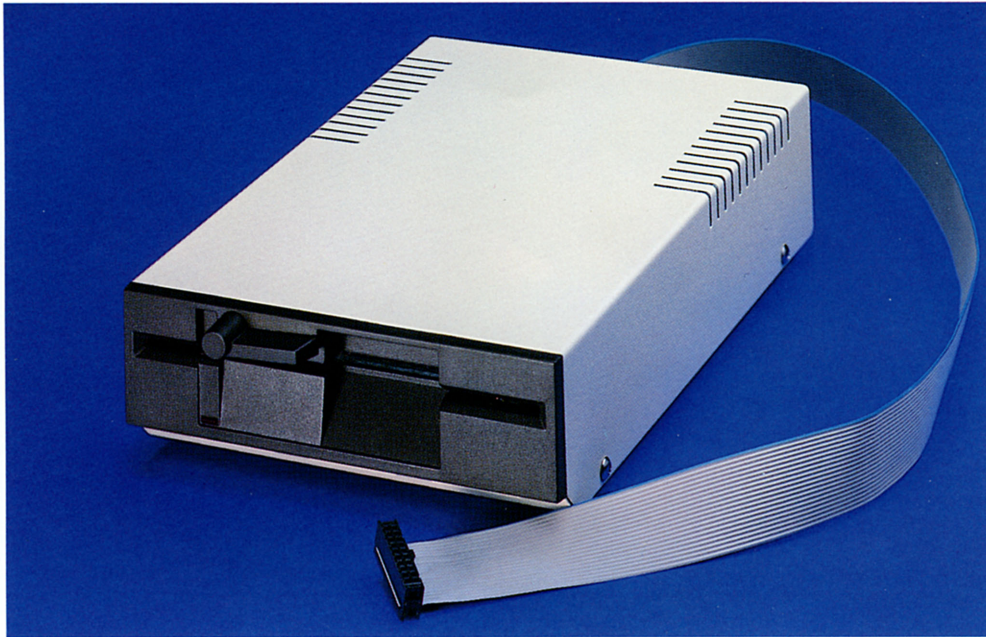
SPECIFICATIONS

- Same size as Apple's power supply using same 4 mounting holes.
- Input voltage: 90 to 135 VAC / 60 Hz or switchable to 180 to 270 VAC / 50 Hz
- High efficiency switching type design
- Output: +5V @ 6000MA, +12V @ 2500MA, −12V @ 1000MA, −5V @ 1000MA
- Ripple: 10MV typ.
- Full load operating temperature: 32° to 122° F (0° to 50° C)

$69

5¼" HALF HEIGHT DISK DRIVE
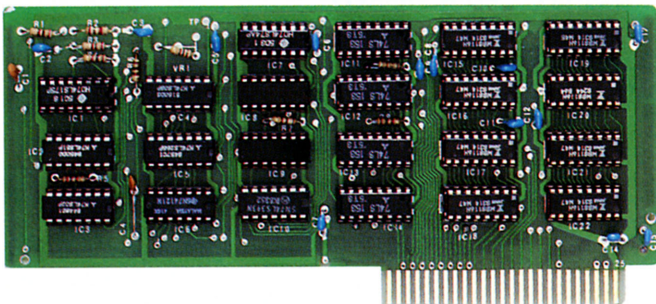
APPLE COMPATIBLE

- Fully compatible with all Apple software

- Special pulse motor makes it accurate, reliable and fast

- Works with the Apple controller card or other compatibles (each controller card handles 2 drives)

- 143K formatted, 35 tracks, 16 sector

- Super quiet

- Full one year warranty

- Complete with 24" long cable that plugs directly into your controller card **$139**

- Disk controller card available if needed; handles 2 disk drives **$59**
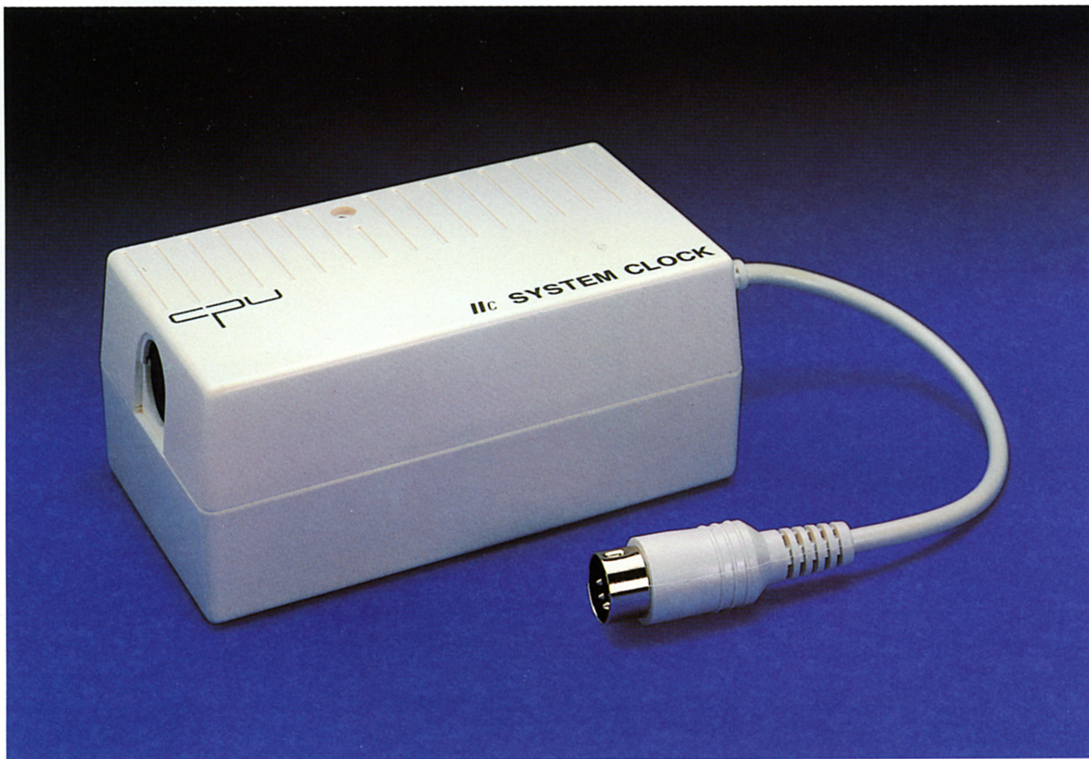
16K RAMCARD

COMPATIBLE WITH APPLE II & II+

- 16K memory expansion card for the Apple II and II+ fully compatible with Applesoft, CP/M and Pascal. Plugs into slot 0.

$79

- Fully Pro-Dos compatible

- Automatic time and date stamping

- Easy to use from BASIC

- Battery operated, uses 3 "AA" batteries (will last 1-2 years before simple replacement)

- Date has year, month, date and day of week

- Time has hours, minutes and seconds

- The only clock for the IIc that displays the date and time on the Appleworks screen.

- Will time and date stamp Appleworks files.

- Auto access from Appleworks data-base (just use a time and date field)

- Pass through serial port — The IIc system clock can plug into either the modem or printer serial port, then the modem or printer plugs into the clock

- No hassle 5 year warranty

Only the IIc System Clock displays the date and time on the IIc Appleworks screen.
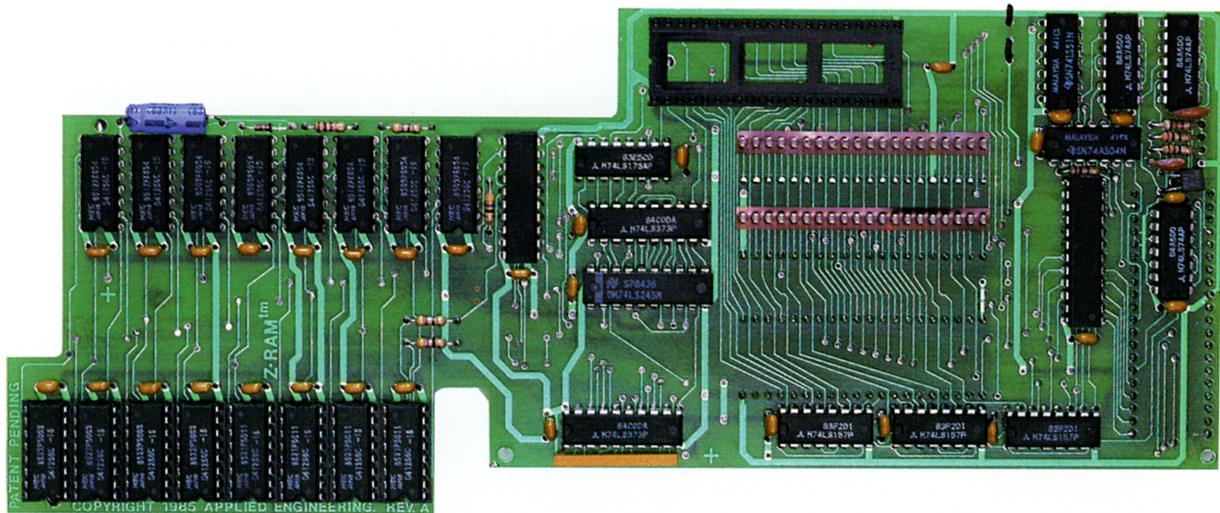
$79.00

VISA MasterCard **and C.O.D. 214/241-6060**

Applied Engineering and Apple computer have teamed up to take your IIc to new heights.

Applied Engineering's Z-RAM card for the IIc is available with 256K or 512K of <u>ADDITIONAL</u> memory and a powerful Z-80 microprocessor for running CP/M software.

Z-RAM fits neatly <u>inside</u> the IIc. Installation is easy, clear instructions show you how. You'll need a screwdriver and about 10 minutes (if you can change a light bulb you can install Z-RAM).

Z-RAM and Appleworks will knock your socks off.

A 256K Z-RAM will give you a 229K available desktop and Appleworks will be completely loaded into memory. Appleworks will now run about 10 times faster in your IIc with one disk drive than in other IIc's with two disk drives. A 512K Z-RAM will give you a 413K available desktop. A 256K Z-RAM can be upgraded to 512K at a later date when your needs grow.

Z-RAM is also a high speed solid state disk drive. With Z-RAM your programs will load and save over 20 times faster. Z-RAM's RAM disk is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M. And with Z-RAM you can copy a disk in one pass. Just insert the original, remove the original, insert blank disk! That's it! Z-RAM is another disk drive, only 20 times faster, 4 times larger capacity, and no whirring, clicking or waiting!

But before you start panting over all that extra memory, don't forget that the Z-RAM card has a built-in high speed Z-80 processor chip that allows you to run CP/M programs like Wordstar, dBASE II, Turbo

PASCAL, Microsoft BASIC, FORTRAN and COBOL and over 3,000 other CP/M programs. So Z-RAM not only makes Apple programs run better and faster, it lets you run MORE programs.

With the Z-RAM card installed, your IIc is still your IIc only now you'll have that extra memory that Appleworks and other programs need. And you can run all that great CP/M software that others can only dream about.

Z-RAM is 100% compatible with all IIc software and hardware including the mouse, second disk, modem and printer. Z-RAM is easily handled by the IIc power supply as power consumption is kept very low by using two custom integrated circuits and a patent pending power saving design. And Z-RAM is from Applied Engineering, the acknowledged leader and innovator of accessories for the Apple.

Z-RAM comes complete with manual, RAM disk software, Z-80 operating system, CP/M manual and a 3 year no hassle warranty.

So the next time somebody asks you why you didn't get an IBM P.C. tell him you bought a IIc because the IBM didn't have enough memory and was too slow and couldn't run CP/M software. And tell him you made it past the 8th grade.

Z-RAM with 256K.............................**$329**
Z-RAM with 512K.............................**$389**
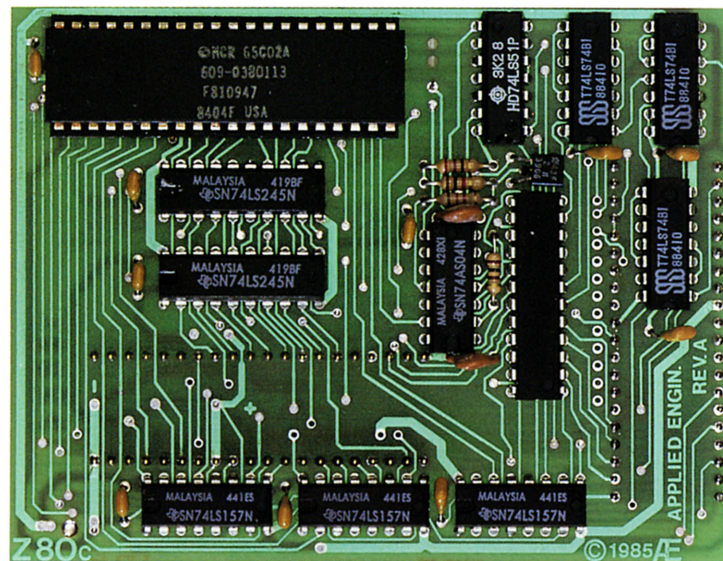
Apple IIc owners can now run the single largest body of software in existence. Enter the CP/M world with the new Z-80c and introduce your IIc to thousands of new programs. With the Z-80c, you'll be able to run Wordstar, dBase II, Turbo Pascal and thousands of other programs that require CP/M. But your IIc will still be your IIc because the Z-80c only turns on when using a CP/M disk.

The Z-80c comes standard with the new 4.0 software, the most advanced system for running CP/M programs ever. But it also runs other versions of CP/M including the popular 2.2 and 2.23 and is fully compatible with Microsoft disks with no pre-boot.

But naturally you'd expect top performance from the Z-80c. After all, it's from Applied Engineering and we've got years of experience with Z-80 cards for the II+ and IIe.

The Z-80c can use all 128K in the IIc, or 64K can be reserved as a RAM disk.

The Z-80c fits neatly inside the IIc. Installation is easy and only takes about 10 minutes (it just plugs in). After installation, your IIc will act and look just like other IIc's, only now you can run all that great CP/M software that others can only dream about.

The Z-80c comes complete with Z-80 card, 4.0 operating system, utility disk, a plain English owners manual and a 3 YEAR WARRANTY. And although the Z-80c is the only CP/M interface on the market for the IIc, we've priced it as though the competition was fierce.

When you consider the fact that many people spend 2 or 3 thousand dollars on a CP/M only computer, our price of $159 is an offer that's practically irresistible.

FEATURES

- 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)
- Specifically designed for High Speed Operation in the Apple IIc
- 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 to fly through CP/M programs at a very low power level
- The Z-80 will allow you to run: dBase II, WordStar, SpellStar, Turbo Pascal, Cobol-80, Fortran 80, Peachtree and all other CP/M based software
- Fast clock: 4 MHZ (Z-80B)
- Documentation included
- High quality P.C. board, gold-plated connector, with mil. spec. components used throughout
- Five year warranty

The Z-80c will give you two computers in one and the advantages of both, all at an unbelievably low price.

$159

and C.O.D. 214/241-6060

ORDER FORM

SEND ORDERS TO OUR ADDRESS
OR CALL **(214) 241-6060**

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	TEXAS RESIDENTS ADD 5 1/8%	
	TOTAL	

Add $3 for shipping in the U.S., $5 to Canada, $10 outside U.S.

"I've purchased several Applied Engineering products over the years.
They're always well made and performed as advertised.
I recommend them whole-heartedly!"

—STEVE WOZNIAK
*Apple Inventor and
Co-Founder*

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"WE SET THE STANDARD"**
214/241-6060