



*Applied
Engineering
Winter/Spring
Catalog*

1989

- II+
- IIe
- IIc
- IIGS
- Laser
- Franklin



APPLIED ENGINEERING

A Division of AE Research Corporation.

November 28, 1988

Dear Applied Engineering customer,

Enclosed is our new catalog for 1989. Since our last catalog, we have added some exciting new items to our growing product line - TransWarp GS, Sonic Blaster, Audio Animator, Ram Express, DClock Option, MacRAMs, and DataLink 2400.

Applied Engineering is the most successful Apple II expansion card manufacturer in the world. One of the primary reasons for our success is due to our exclusive commitment to the Apple II. Apple enhancements are our only business. And that specialization allows us to commit our resources to creating the best enhancement products possible for your computer.

We thank you for your past support and we appreciate the opportunity to serve you again. Should you have any questions or need advice, please feel free to give us a call.

Sincerely,

Tom Milks
Sales Manager

APPLIED ENGINEERING

Applied Engineering, the oldest and largest of the Apple II developers, stands as the recognized leader of the industry. We didn't get here by sitting on our laurels...the numerous products recognized by you as "Reader's Choice", "Top Ten All Time" and "Product of the Year". We got here by virtue of having fallen in love with the Apple II many years ago. And by paying attention to detail and listening to our customers ever since.

you, our customer. And *you've* been known to tell us a thing or two from time to time. It's a two-way street, and Tech Support is one of the best ways of keeping in touch.

New products.

Our innovation sets us apart. We have consistently set the industry standards for each and every new product we produce. But, we don't let haste blind us to quality. We'll

Made in the U.S.A.

It's more than a catch-phrase at Applied Engineering. We make our products here for patriotic reasons and for sound business reasons, too. Reasons like *quality control* - with a shorter communications pipeline between departments, *customer service* - by maintaining close contact with you, and *market flexibility* - by responding quickly to changing conditions.

Reliability.

After eight years in this industry, we've seen a lifetime of comings and goings among our competitors. Their goings, particularly, have been unfortunate for you. The poor guy in Tampa who bought a shoddy memory card from a company that's now a memory. The school system in suburban Chicago that invested in modems, only to find no technical support to help them get on-line. The wasted time, money and dusty boxes of worthless products would fill a warehouse. Applied Engineering is your best bet to be around to honor warranties if need be...and that matters.



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Tech support.

Our technical support is the industry's finest. Free, patient and unlimited support of all of our products. We've been known to pass along some friendly, expert advice concerning other products and issues important to

continue to introduce products as often as possible, but only when they reach the point that we're proud to put our name on them. Because we plan to be around for the long haul. And we won't risk the reputation we've worked so hard to earn by introducing a product before it's ready.

Quality.

Simply stated - you get what you pay for. Our customers prove to us time and again that they're willing to pay a fair price to get the best. And that in the final analysis, a lower-quality peripheral that costs a few dollars less isn't what you want. After all, you bought an Apple in the first place.

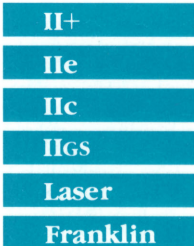
Commitment.

And always, a commitment to making the best. The bottom line: we've gotten where we are today by making the highest quality Apple II peripherals available, selling them at a fair price and supporting them all along the way. You demand quality and for eight years we've delivered. As you browse through our latest catalog, please know we genuinely appreciate your business and we plan to continue earning it.

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RAM FACTOR™

Now anyone with an Apple II+, Franklin, Laser 128, Apple IIe or IIgs preferring to use slots 1 through 7 can enjoy the speed and performance that they've been waiting for.

With RamFactor™, you'll be able to instantly add another 256K, 512K, or a full 1 MEG on the main board and an expansion connector can address an additional 16 MEG of memory for possible future expansion. Since virtually all standard software is automatic-

records in the database and lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load all of AppleWorks into RAM, dramatically increasing speed and eliminating the time required to access the program disk. It will even display the time and date on the AppleWorks screen with any ProDOS clock. RamFactor will automatically segment large files so they can be saved on 5.25" disks. All

fully expanded RamFactors for more than 4 hours.

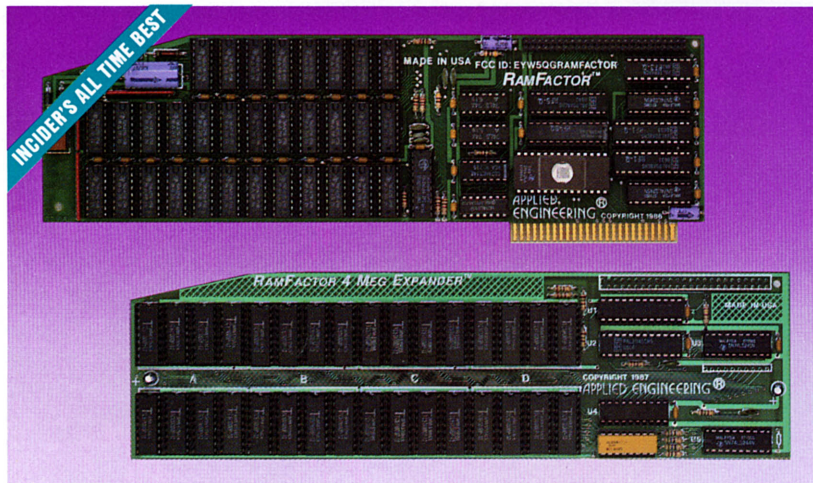
Powerful program switcher.

With RamFactor, you can organize memory into multiple work areas and switch between them. Each work area can contain different programs and, with proper formatting, even different operating systems. Now you can switch from one program to another or even switch from AppleWorks to DOS 3.3 to CP/AM to Pascal 1.3 to ProDOS in under a second. And with our battery back-up option, you can have permanent storage for up to 20 years.

Features:

- 256K to 1 MEG on main board.
- Expansion connector for possible future expansion to 16 MEG
- Fully Apple II Memory Expansion compatible in II+ and IIe, RAMdisk only in IIgs
- Compatible with Apple IIe, II+, IIgs, Franklin and Laser 128
- Battery backup option allows you to turn on your Apple and run your favorite programs in just a few seconds
- Can be configured to recognize ProDOS, DOS 3.3, Pascal 1.3, and standard CP/AM
- Built-in RAM drive software (a true RAMdisk not disk caching)
- Systems are directly bootable from RamFactor if desired
- Diagnostic software included
- Automatic expansion with AppleWorks 1.3, 2.0 and 2.1
- Allows Apple II+ and IIe to run your AppleWorks without buying any additional software
- Accelerates AppleWorks
- Displays time and date on the AppleWorks screen with any ProDOS clock
- Fits any I/O slot except slot 3 (or II+'s slot 0)
- Fully socketed and user upgradeable
- 4 MEG RamFactor Expander option available
- 5 year warranty — parts and labor

Now you can have a slot 1 through 7 card with up to 5 MEG on one slot.



RamFactor

Up to 1 MEG on card

RamFactor 4 MEG Expander

Up to 4 MEG on card

ally 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 databases, and expanded spreadsheets. And with the battery backup option, you can switch on your Apple and your favorite software will be up and running in just a few seconds.

Very compatible.

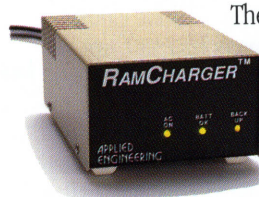
All the leading software is already compatible with RamFactor. Programs like AppleWorks, MultiScribe, Beagle Brothers' TimeOut Series, Springboard Publisher and many others. And RamFactor is fully ProDOS, DOS 3.3, Pascal 1.3 and CP/AM compatible. In fact, no other slot 1-7 memory card is more compatible 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. RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of

this performance is available on the Apple IIe, 64K II+, Franklin, or Laser 128 when used with an 80 column display. RamFactor - no other standard slot card comes close to enhancing AppleWorks as much.

"Electronic hard disk"



The RamCharger™ battery backup option permanently stores your files with constant low power from your wall outlet . . . even with your computer turned off. And in the event of a power failure, RamCharger's battery retains programs and data for up to 10 hours. When power returns, RamCharger automatically recharges the battery to full strength. With power from your wall outlet, RamCharger will back up your RamFactor card's RAM memory indefinitely. And because RamFactor plugs into slots 1-7, it's the only memory card that can cold boot an Apple without using slow floppy or hard disks. An accessory "Y" cable allows one RamCharger to power two

RamFactor with ZeroK	\$189
RamFactor with 256K	\$299
RamFactor with 512K	\$449
RamFactor with 1 MEG	\$749
RamCharger	
battery backup	\$179
"Y" Cable	\$24
RamFactor 4 MEG	
Expander with 0-4 MEG	CALL
RamFactor Expander Kit	\$29
<small>(2 chip replacement set for old revision RamFactors)</small>	

II+
IIe
IIgs
Laser
Franklin

TRANSWARP GS™ AND TRANSWARP™

Computing at Warp Speed.

It's an experience you shouldn't miss. And with TransWarp™ and TransWarp GS™ (available Winter 1988) you won't have to. Because TransWarp for the IIe, II+, Laser and Franklin will run your software up to *three and a half times faster*. And TransWarp GS will run software on your IIGs *more than twice as fast*.

No more yawning while your computer slowly rearranges text, re-configures graphics or calculates spreadsheets. With ultra-fast RAM, our TransWarps speed up virtually all Apple software - including AppleWorks, Beagle Brothers' TimeOut Series, Springboard Publisher, SuperCalc 3a and a world of educational software, graphics and games.

And both TransWarp and TransWarp GS are compatible with all standard peripheral cards (such as GS-RAM, RamWorks and Apple memory cards), Chinook and Sider hard disks, 3.5" UniDisks, 80 column cards (TransWarp only), modems, clock cards, mice and more. There's even a 16 bit upgrade chip available for the TransWarp, for the serious programmer.

A cinch to use.

Simply plug TransWarp into any slot in your Apple II, IIe, or II+ (including slot 3 in the IIe). Or plug TransWarp GS into slot 3 or 4 on the IIGs (TransWarp GS won't override the slot's function). And instantly you'll be computing at speeds you only dreamed about before.

TransWarp works automatically - should you ever want to slow down to normal speed, simply press the ESC key while turning your computer on. Controlling the TransWarp GS is just as easy - we've added a third option to your Control Panel's speed control... TransWarp speed!

Since both TransWarp and TransWarp GS are completely transparent, you won't need pre-boot disks or special software. They're ready to go right out of the package.

Speed = productivity.

Imagine the productivity gains you'll achieve when your programs are running two or 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.

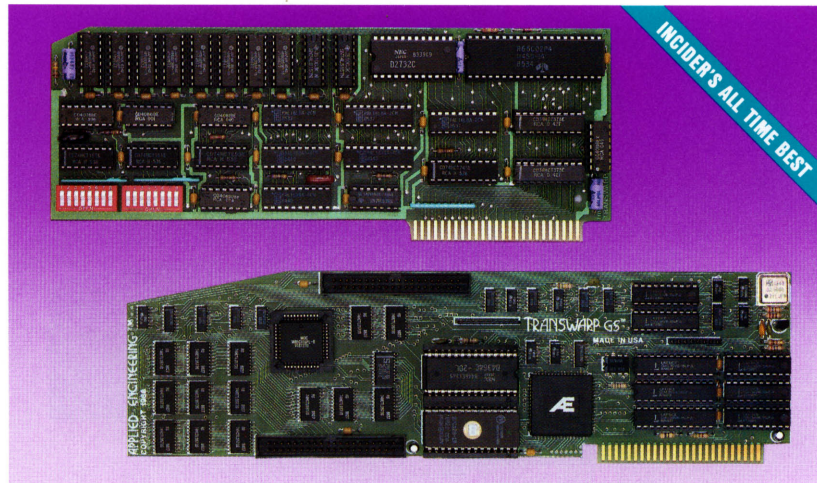
And all along, the only knock on the IIGs has been its lack of speed - a complaint that will vaporize with your first bout at Warp Speed!

Features: TransWarp (compatible with IIe, II+, Laser and Franklin)

- 3.6 MHz 65C02 (compared to Apple II's normal 1 MHz speed)
- Accelerates main and auxiliary memory

Features: TransWarp GS (compatible with IIGs only)

- Approximately 7 MHz (compared to IIGs's 2.8 MHz fast mode)
- Automatically accelerates processing speed
- Designed for slot 3 or 4 - without overriding slot's function
- Speed adjustable from Classic Desk Accessories, Control Panel
- Choose between normal, fast and TransWarp speeds



TransWarp

TransWarp GS

- 256K of ultra-fast RAM
- Totally transparent operation with *all* software
- Plugs into any slot, including the IIe's slot 3
- Gives II+ a total of 128K of bank switched memory
- Gives 48K II+ ability to run ProDOS
- Built-in diagnostics
- 16 bit option - 65C802 available for advanced users
- 5 year warranty - parts and labor
- Proudly made in the U.S.A.

- Built-in ROM chip automatically installs TransWarp option
- Built-in diagnostics
- Compatible with all standard hardware and software
- 1 year warranty - parts and labor
- Proudly made in the U.S.A.

TransWarp Accelerator \$219
TransWarp GS Accelerator \$399

Experience the thrill of computing at Warp Speed.

II+

IIe

IIGs

Laser

Franklin

GS - R A M TM A N D G S - R A M P L U S TM

Applied Engineering's IIGS memory cards, the GS-RAMTM and GS-RAM PlusTM are the ONLY large capacity IIGS memory cards that are fully DMA compatible. Others are either totally non-compatible or compatible only in certain specific configurations.

That difference in a memory card is critical. Here's why: DMA (Direct Memory Access) tremendously speeds up computer operations by bypassing the microprocessor. All addressing and

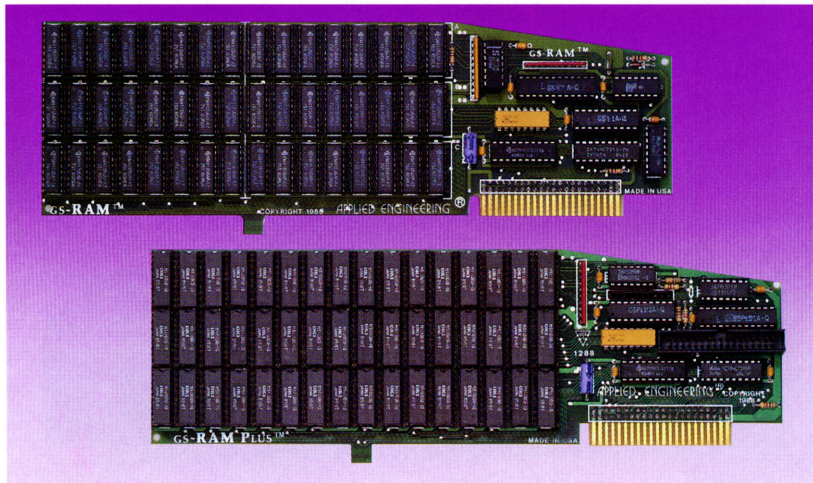
gram that dramatically enhances the capabilities and speed of AppleWorks. The Expander eliminates disk access time by allowing all of AppleWorks, including print functions, to automatically load into RAM. You can even load Pinpoint or the TimeOut Series into RAM for instant response.

This powerful software:

- Allows AppleWorks to recognize up to 8 MEG on the desktop

- GS-RAM Plus expands from 1 MEG to 6 MEG
- GS ExpanderTM adds up to 2 MEG to either card
- Full DMA compatibility in *any* configuration
- 5-year warranty - parts and labor
- 6 RAM banks (most cards have only 4)
- Piggyback memory expansion port
- Ultra-fast disk caching on ProDOS 8 *and* ProDOS 16
- Free graphic Super Hi-Res diagnostic software
- Free AppleWorks Enhancement software
- No soldered-in RAM chips
- Accepts GS Expander for additional 2 MEG
- No configuration blocks to set
- RamKeeper option available for permanent storage
- Proudly made in the U.S.A.

Now expand the IIGS with up to 8 MEG of "Instant On" memory with GS-RAM Plus and RamKeeper.



GS-RAM
Up to 1.5 MEG on one card

GS-RAM Plus
Up to 6 MEG on one card

control logic is contained on our cards, enabling a DMA device to bypass the microprocessor and go straight to the heart of things...the computer's memory.

AE's full DMA compatibility means GS-RAM and GS-RAM Plus run all GS software, support all *current and future* DMA peripherals, and don't require you to adjust the size of your RAMdisk everytime you use a DMA device...something every other large capacity memory card requires you to do.

Software.

Both GS-RAM and GS-RAM Plus come complete with Applied Engineering's own powerful enhancement software.

Disk caching software is included, tremendously speeding up the computer's access to the 3.5 Drive and running most applications up to *seven times faster*.

Super Hi-Res diagnostic utility software is also included free. It graphically shows the location of bad or improperly installed chips and even tests for CAS before RAS chips.

Your free software also includes AE's exclusive AppleWorks Expander pro-

- Increases word processor lines from 7,250 to 22,500
- Increase database records from 6,350 to 22,500
- Increases clipboard capacity from 255 lines to 2,042
- Automatically loads AppleWorks (including print functions) into RAM
- Automatically segments files for saving large files on multiple floppies
- Provides a built-in print buffer

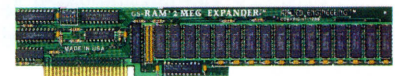
RamKeeper option.

Coupled with Applied Engineering's RamKeeper, your GS-RAM or GS-RAM Plus actually gives you an internal "electronic hard disk" with an instant-on Finder and emergency power backup. RamKeeper even supports an Apple IIGS memory card (and most others) alone or in combination with one of our cards. See the RamKeeper page in this catalog for more details on how this \$189 wonder gives your IIGS all the speed and power it was meant to have.

Compare our features:

- GS-RAM expands from 256K to 1.5 MEG

GS-RAM with ZeroK	\$139
GS-RAM with 256K	\$249
GS-RAM with 512K	\$399
GS-RAM with 1 MEG	\$699
GS-RAM with 1.5 MEG	\$999
GS-RAM Plus with ZeroMEG	\$169
GS-RAM Plus with 1 MEG	\$699
GS-RAM Plus with 2 MEG	\$1249
GS-RAM Plus with 3-8 MEG	CALL
GS-Expander with 1-2 MEG	CALL
RamKeeper option	\$189



IIGS

RAM KEEPER™

Permanent storage with an "electronic hard disk."

Now when you turn on your IIGS, your favorite program can appear on screen in just a few seconds! With RamKeeper™, your IIGS memory card will retain stored programs and stored data while your IIGS is turned off. RamKeeper allows you to divide your IIGS memory into part "electronic hard disk" and part RAM for your programs workspace—in almost any way you want and at anytime you want. GS-RAM, GS-RAM Plus, Apple IIGS memory card and most other IIGS memory cards are compatible with RamKeeper.

Supports up to two IIGS memory cards at the same time.

If you bought your IIGS with Apple's memory card and later wished you had the GS-RAM, no problem. RamKeeper will support both cards plugged into RamKeeper simultaneously. And even with two cards, you can still keep slot 7 open with our optional Slot-Mover™.

How it works:

Just unplug your IIGS memory card from your computer, plug your IIGS memory card into RamKeeper, plug RamKeeper into the IIGS memory slot. If you have another IIGS memory card, an additional card socket on RamKeeper will accommodate your second card. That's all there is to it.

Reliability from the most experienced.

Applied Engineering has the most experience in the industry with battery-backed memory for the Apple. With our RamKeeper, you are assured of the most reliable memory backup system available. And in the world of battery-backed memory *reliability* is everything.

That's why we use the more dependable Gel/Cell's instead of Ni-Cad batteries (if Ni-Cads aren't discharged periodically, they lose much of their capacity).

RamKeeper has close to six times (about 6 hours) the "total power failure" backup of other systems. When power returns, RamKeeper automatically recharges the battery to full charge, and the sealed battery pack stays *outside* your computer case, where an unlikely leak won't ruin your computer circuitry.

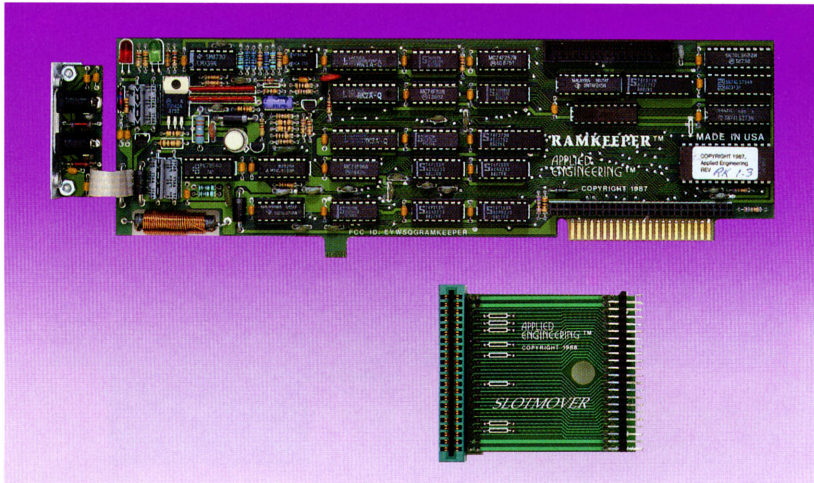
RamKeeper uses a Switching Power

Supply - the same technology used by Apple for the IIGS power supply. This design uses energy much more efficiently to keep your Apple running cooler. With power from your wall outlet, RamKeeper will backup your IIGS memory card's RAM indefinitely.

Free AppleWorks Enhancement software.

Our powerful AppleWorks Enhancement software is included in RamKeeper's price and is well worth the

- RamKeeper configures linearly to eliminate memory gaps, others don't
- RamKeeper includes EPROM-protected operating software, other use floppy installation
- RamKeeper's software expands AppleWorks internal limits, others don't
- RamKeeper includes disk-caching software, others don't
- RamKeeper comes *complete* with battery, software and documentation



RamKeeper

Slot-Mover

purchase price alone. See a complete description under the "Software" heading on the previous page.

Significant differences:

Applied Engineering's longer experience with battery-backed memory cards shows in the way we designed RamKeeper. There are significant differences between RamKeeper and other systems:

- RamKeeper comes *complete* with battery for 6 hours of total power failure backup, others use shorter-life Ni-Cads and charge extra for them
- RamKeeper has external battery storage, others have risky internal storage
- RamKeeper powers up to 16 MEG, others power only up to 8 MEG maximum
- RamKeeper permits mixing and matching different memory cards and chip sizes, others have more limited combinations
- RamKeeper configures via the IIGS Control Panel instantly, others require special pre-boot software
- RamKeeper automatically configures for two cards, others have manually-moved jumpers

- Full 5 year warranty
- Proudly made in the U.S.A.

RamKeeper \$189
Slot-Mover Option \$39
Additional Gel/Cell Battery for even longer emergency backup life (one is included) \$15



An "electronic
hard disk"
for \$189.

IIGS

RAMWORKS™

Add up to 3 MEG memory with the RamWorks® III expansion board.

You command vast power with RamWorks III™ — up to 48 times more memory than your IIe came with.

You work faster, more efficiently. Your IIe does things it could never do before.

Memory intensive software like AppleWorks runs faster. You can put Pinpoint or Beagle Brothers' TimeOut

AppleWorks' 7,250 word processing lines, you get up to 22,500 lines. And clipboard capacity zooms from AppleWorks' 255 lines to 2,042 lines. If your IIe has a ProDOS clock, the time and date will be automatically stamped on your files and displayed on screen.

RamWorks boards include an AppleWorks printer buffer — up to 105K in the 512K model — so you can keep working while your printer is printing. Also, you don't have to buy a separate

For even more power, snap a 512K, 1 MEG or 2 MEG Expander Card™ into the RamWorks III low profile connector. The Expander Card won't interfere with Slot 1.

Recover your investment in the wrong card.

Most of it, anyway.

If you bought someone else's RAM card — one that's not recognized by your programs — RamWorks III can help recoup your loss. Pull the 64K or 256K memory chips off your old card and plug them into RamWorks III.

Truly compatible.

RamWorks III is compatible with more off-the-shelf software than any other RAM card. It is recognized by all memory intensive programs for the IIe.

Its power enhances AppleWorks, Beagle Brothers' TimeOut Series, Tax Preparer, Springboard Publisher, Sensible Speller, ProFILER, Managing Your Money, SuperCalc 3a, VIP Professional and many, many more...even software written specifically for Apple cards.

RamWorks III is compatible with most hardware add-ons like ProFile and Sider hard disks.

Of course, RamWorks III is fully compatible with all IIe's — enhanced or unenhanced, American or European.

Easy to install and use.

RamWorks III quickly plugs into your IIe's auxiliary slot. You get memory expansion and super-sharp 80 column text (U.S. Patent 4601018).

RamWorks III comes with everything you need to get up and running. The easy-to-understand manual shows you how to get the most from your new memory. The two accompanying 5.25" disks include a Hi-Res memory chip test, AppleWorks enhancement program, ProDOS and DOS 3.3 RamDrive™ and other useful utility software.

Superior color graphics, more readable text.

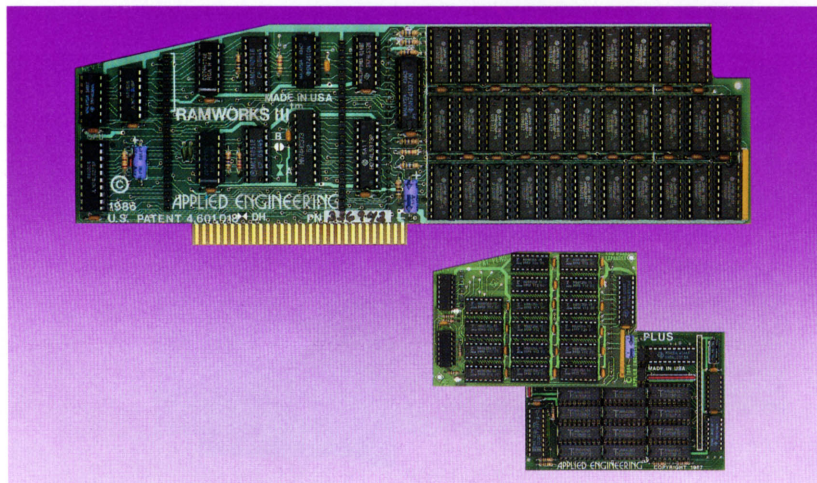
The ColorLink™ RGB Option gives brilliant, sharp graphics and text.

It means all Apple standards for RGB output control. So it's compatible with more off-the-shelf software.

You can use Apple or IBM RGB monitors. ColorLink provides Apple standard analog and IBM standard digital RGB outputs (cables included).

ColorLink offers four text colors so you can use the one that's easiest on

The industry
standard for
IIe expansion.



RamWorks III

512K Expander

2 MEG Plus Expander

Series into RAM at the same time for instant response. And you can work with massive files without constantly going back to your disk drive.

Run AppleWorks 20 times faster.

With 512K or larger RamWorks, all of AppleWorks (including printer routine) automatically loads into RAM.

The result? AppleWorks runs up to 20 times faster. You don't waste time accessing the program disk drive. You switch instantly from word processing to spreadsheets to database. Anytime. And without wear on disk drives.

No other expansion board, not even Apple's, gets so much out of AppleWorks.

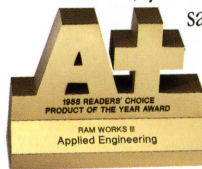
RamWorks III gives you a huge AppleWorks desktop — 366K with the 512K RamWorks III and on up to 2,251K with the 3 MEG RamWorks III (even after all of AppleWorks automatically loads in memory).

RamWorks eliminates AppleWorks' internal memory limits. While AppleWorks 2.0 and 2.1 make up to 6,350 database records available, you get up to 22,500 with RamWorks. Instead of

print buffer, a savings of up to \$250.00.

Auto-segments large files.

RamWorks automatically segments large files so they can be saved on two or more disks. When you need to work with the file, you simply load in the same sequence you saved it.



Add up to 3 MEG without using a single expansion slot.

RamWorks III, even when it's carrying its full 3 MEG of new memory, fits in your IIe's auxiliary slot. Your valuable expansion slots 1 through 7 are free for other peripheral cards.

If you don't need all of that power now, you can start with as little as 64K. It's easy to add additional memory to the expandable RamWorks III board as your needs grow.

You can go to 1 MEG on the main board using standard RAMs. That's more memory than many people ever use. (1 MEG is about 500 pages of text.)

IIe

your eyes (others offer only green).

The ColorLink option plugs into the back of RamWorks III (or can be used in conjunction with piggy-back memory expanders), so it won't interfere with Slot 1.

You can order ColorLink with your RamWorks III board or add it later.

Optional 16 bit power.

You can explore powerful programming possibilities with Applied's optional 65C816 Card. It's capable of linearly addressing more than 1 MEG.

It connects to RamWorks III's built-in CPU port. Instead of using another slot, AE's 65C816 Card simply replaces the 65C02. It maintains complete 8-bit compatibility.

The RamWorks basic® alternative.

Need power but not all the capabilities of RamWorks III? Look at RamWorks basic. It has the same performance features as RamWorks III, it's attractively priced and it's available with up to 512K memory on the main board, and can use all the RamWorks III "piggy-back" options.

Backed by the leader.

Applied Engineering has been designing and building Apple enhancements for over 8 years. We invented large RAM cards for the Apple. Today, our innovative technology leads the field. We sell more Apple enhancements than anyone else, including Apple Computer. So you know we'll be around to solve problems and answer questions.

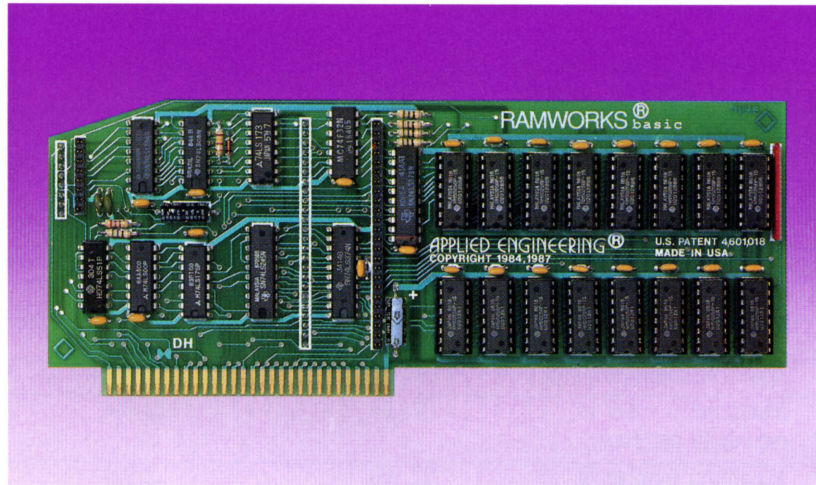
It's got it all:

- 5 year warranty — parts and labor
- Super sharp 80 column text (U.S. Patent 4601018) with or without RGB option
- Supports Double Hi-Res graphics (with or without RGB option)
- Expandable up to 1 MEG (1024K) on main board
- Can use 64K or 256K RAMs in any memory block
- Linear addressing co-processor port
- Automatic AppleWorks Expansion — from 366K on a 512K RamWorks III and 2,251K on a 3 MEG RamWorks III
- Accelerates AppleWorks operation
- Built-in AppleWorks printer buffer
- 100% compatible with all standard IIe software
- RamDrive™ and ProDrive™, the ultimate disk emulator software included free

- Compatible RGB option featuring ultra-high resolution color graphics and multiple text colors, available with cables for both Apple and IBM type monitors
- Self-diagnostic software included
- Lowest power consumption (U.S. Patent 4601018)
- Takes only one slot — No slot 1 interference
- Software industry standard
- 16 bit option

CP/AM MEGDrive™

CP/AM MEGDrive is just like RamDrive, only for CP/AM. CP/AM MEGDrive runs on any Z-80 card that runs standard CP/AM, e.g. Applied Engineering Z-80 Plus, Microsoft Soft Card or PCPI. CP/AM MEGDrive 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 instan-



RamWorks basic® Expansion Board

- Advanced computer aided design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- Displays date and time on the AppleWorks screen with any ProDOS compatible clock
- Much, much more!

RamWorks basic with ZeroK	\$119
RamWorks basic with 64K	\$219
RamWorks basic with 256K	\$229
RamWorks basic with 512K	\$379
RamWorks III with ZeroK	\$139
RamWorks III with 64K	\$239
RamWorks III with 256K	\$249
RamWorks III with 512K	\$399
RamWorks III with 1 MEG	\$699
RamWorks III with 1.5 MEG	\$1079
RamWorks III with 3 MEG	\$1959
512K Expander	\$399
2 MEG Plus Expander with 1 MEG	\$729
2 MEG Plus Expander with 2 MEG	\$1279
65C816 16 Bit Card	\$159
ColorLink RGB Option	\$129

taneous when used with CP/AM MEGDrive.

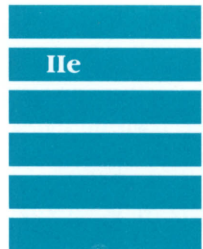
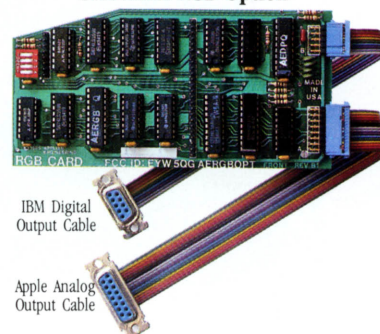
Z-80 Plus, Microsoft version \$29
PCPI APPLI-CARD version \$29

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 RamWorks III or larger required). When used with advanced VC IIe you'll get 235K with a 256K RamWorks III and 437K with a 512K RamWorks III.

VC IIe Expander \$29

ColorLink RGB Option



Comparison Between RamWorks™, RamFactor™, GS-RAM™ and GS-RAM Plus™

Many of the features and benefits of RamWorks III™, RamFactor™, GS-RAM™ and GS-RAM Plus™ 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 III is specially designed for the Apple IIe while

GS-RAM and GS-RAM Plus are specially designed for the Apple IIGS. These three cards will not work on a II+, Franklin or Laser. That leaves RamFactor as the source of most of the confusion, since it is compatible with the IIe, II+, IIGS, Franklin, Laser 128 and most compatibles.

For the most powerful AppleWorks enhancements, stick with RamWorks III for the IIe and GS-RAM or GS-RAM Plus (the only difference is capacity) for the IIGS. For other applications, RamFactor reduces disk access time and storage and can be battery backed-up. See the accompanying chart for further comparison.

Capability	RamWorks® III	RamFactor™	GS-RAM™ GS-RAM Plus™
Computer compatibility	Apple IIe	Apple II+, IIe, IIGS and compatibles	Apple IIGS
Maximum memory on main card	1 Megabyte	1 Megabyte	1.5 MEG GS-RAM 6 MEG GS-RAM Plus
Expander cards (for expansion beyond main card)	512K, 2 MEG	RamFactor 4 MEG, "Y" connector for 2 RamFactors	2 MEG RAM
Compatible slot	Auxiliary slot	Slots 1-7 except 3	Memory expansion
RAM disk	Disk based	EPROM/disk based	IIGS Control Panel
Software standard	Yes	Yes	Yes
Battery backup	No	Yes	No on main board*
AppleWorks compatibility	All versions	Versions 1.3, 2.0 and 2.1	Versions 2.0 and 2.1
Maximum number of records in database	22,500	22,500	22,500
Maximum number of lines in word processor	22,500	22,500	22,500
Lines in WP and DB clipboard	2,042	2,042	2,042
Autoload AppleWorks	Yes	Yes	Yes
Displays time on screen with ProDOS clock	Yes	Yes	Yes
Auto-segments large files	Yes	Yes	Yes
AppleWorks printer buffer	Yes	No	Yes
Fully socketed and user upgradeable	Yes	Yes	Yes
16 bit option (65C816)	Yes	No	No

Comparisons made using AppleWorks 2.1, however, similar performance is obtained using older AppleWorks versions with RamWorks.

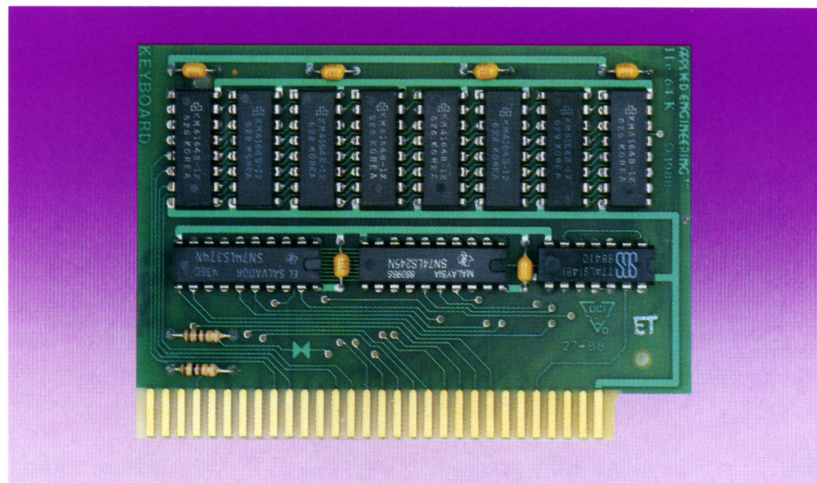
*RamKeeper provides the GS-RAM and GS-RAM Plus with battery back-up.

AE EXTENDED 80 COLUMN CARD™

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 Double High Resolution graphics for programs like MultiScribe, GEOS and Managing Your Money
- Automatically expands AppleWorks 1.0-1.3 to 55K desktop and meets the requirements of AppleWorks 2.0 and later versions
- ProDOS will use the AE Extended 80 Column Card™ as a high speed disk drive
- Documentation included, we show you how to use all 128K
- 5 year warranty — parts & labor

Extended 80 Column Card \$119



Bring
Double Hi-Res
to your IIe.

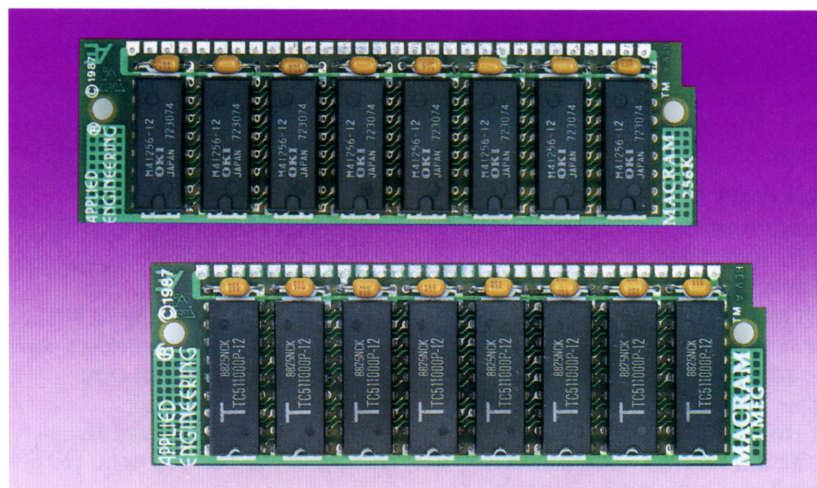
IIe

MACRAM™

Applied Engineering now produces a line of high quality memory expansion cards for the Macintosh Plus, SE and II. Our MacRAM™ SIMMs are available in 256K, 1 MEG and a 2 MEG Kit (consisting of a pair of 1 MEGs).

MacRAMs feature total compatibility, AE's famous workmanship, complete documentation and our full five year warranty.

MacRAM with 256K \$179
MacRAM with 1 MEG \$489
2 MEG Kit
(Two 1 MEG MacRAMs) \$969



Macintosh Plus
SE
II

PC TRANSPORTER™

PC Transporter™, our "PC on a card" wonderboard has drawn rave reviews from the experts. And for good reason.

PC Transporter gives your Apple IIe, II+ or IIGS the power to speak IBM's MS-DOS. Run MS-DOS programs on your Apple at more than *three times the speed* of an IBM XT.

For the first time:

Bring your MS-DOS work home from the office and use your Apple to get caught up...or get ahead.

software and even an installation video to help get you up and running.

PC Transporter acts as a universal disk drive controller, enabling your Apple 3.5 Drive to run MS-DOS or ProDOS, and to shift instantly from ProDOS to MS-DOS.

Tailor your configuration.

What do you need to get up and running? That depends on what equipment you already own and what you'll be running. For example: if you plan

get faster operation and better quality graphics.

Add in the cost of the peripherals you'd need for that "cheap" clone, and you'll see the price of a PC Transporter start to look very attractive indeed.

Upgrade your Apple while you're at it.

A few more considerations - you can access up to 768K of extra RAM for use with your Apple programs. PC Transporter conforms to the Apple II Memory Expansion Card protocol when in Apple mode. That's a \$500 value even if you never use the card for MS-DOS.

PC Transporter comes with our exclusive AppleWorks Expander™ program that dramatically enhances the capacity, speed and capabilities of AppleWorks.

The do-everything computer.

Turn your Apple into a fast, powerful, work-at-home tool. The incredible combination of ProDOS and MS-DOS means a computer that'll run practically anything. And know that Applied Engineering stands behind PC Transporter with a full one-year warranty.

PC Transporter with 768K \$679

Specifications:

CPU: High performance true 16 bit V-30 microprocessor; chip has full 8086 and 8088 instruction set operating at 7.16 MHz

User RAM: 640K maximum (IBM)

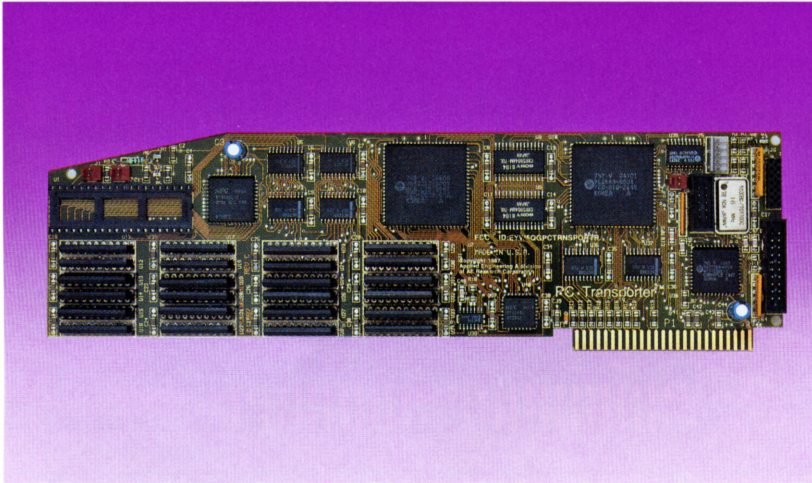
System RAM: 128K

Apple User RAM: 768K maximum

Input/Output Devices

- Video
 - TTL RGB video
 - NTSC composite video
 - NTSC composite input (Apple II video)
 - Apple IIGS analog with adapter
- CGA modes:
 - Mode 0: 40 x 25 text; 16-level monochrome
 - Mode 1: 40 x 25 text; 16 foreground and 8 background colors
 - Mode 2: 80 x 25 text; 16-level monochrome

Now Apple speaks IBM.



PC Transporter

Run Lotus 123, dBASE III PLUS, Symphony, Microsoft Word, Flight Simulator and thousands of other business and entertainment titles on your Apple!

Shop both sides of the software aisles and discover a new world of programs and software that you can now enjoy.

Exchange ProDOS and MS-DOS data with your MS-DOS friends and co-workers. Even transfer your own files from ProDOS to MS-DOS and back again.

Store IBM programs on any ProDOS storage device including the Apple 3.5 Drive, Apple UniDisk™ 3.5, Apple 5.25 Drive, SCSI or ProDOS compatible hard drives.

You don't have to be a programmer.

PC Transporter was designed by experts, so you don't have to be one to use it. The design team includes the former project managers for the Apple IIe and IIc, the co-designer of the Apple II disk controller and the author of ProDOS.

We include clear, understandable installation instructions, "pre-boot"

to use strictly 3.5 format MS-DOS, your Apple IIGS disk drive does the job. If you need 5.25 IBM capability, you'll need one of our IBM-style TransDrive™ disk drives.

There's even a socket on PC Transporter for an 8087-2 Math Co-processor chip to speed you through spreadsheets. Call Applied Engineering or ask your dealer for more details on your specific needs.

A few words about cost:

Compare the price of a PC Transporter - you'll find it about on par with even the cheapest, stripped-down IBM clones.

Then consider that your PC Transporter gives the Apple peripherals you already own the power to work with MS-DOS programs.

You won't need two of everything. And you won't have to crowd your desk with an extra cpu, an extra monitor, an extra disk drive or two, an extra mouse, an extra modem, an extra hard disk or even an extra printer.

Your Apple peripherals and PC Transporter will not only work, you'll

II+

IIe

IIGS

Franklin

PC TRANSPORTER ACCESSORIES

- Mode 3: 80 x 25 text; 16 foreground and 8 background colors
- Mode 4: 320 x 200 graphics, 4 colors
- Mode 5: 320 x 200 graphics, 4-level monochrome
- Mode 6: 640 x 200 graphics, monochrome

- Floppy disk controller
 - Controls two double-sided, 40 track 5.25" or 80 track 3.5" disk drives
 - Reads and writes IBM 8 or 9 sector disk formats
 - Supports Apple format on 3.5" and 5.25" floppy disk drives
 - Can boot ProDOS diskettes on double-sided 3.5" or 5.25" floppy disk drive
- Keyboard
 - "F" keys, control, shift, shift lock, open and closed Apple lines remapped for PC/XT style keyboard
 - Optional IBM PC keyboard port
- Psuedo I/O
 - Common IBM PC/XT I/O devices supported with common Apple II I/O devices (such as Apple mouse and ProDOS clock)
 - Hardware trap for I/O and BIOS locations
- Sound: uses Apple II speaker for both IBM and Apple sound output
- Power supply requirements
 - PC Transporter on standby: 5 volts; 350 mA
 - PC Transporter active: 5 volts; 600 mA
 - PC Transporter active with 8087-2; 5 volts; 1,075 mA
- Dimensions
 - Length: 10.30 inches
 - Height: 3.05 inches
- Space required
 - Occupies only one expansion slot (1-7 except 3)

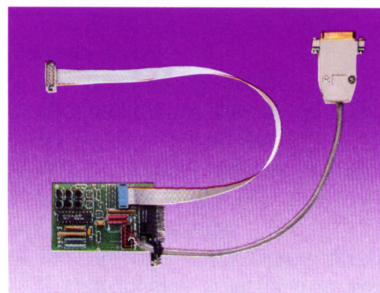
All of the options for PC Transporter are available from Applied Engineering.

5.25" IBM Format 360K Drive System

Optional unit allows MS-DOS programs on 360K 5.25" disks to boot from PC Transporter. Unit can also accept up to two IIGs 3.5" drives daisy-chained to back of unit as well as additional expansion for another 360K 5.25" Half-Height floppy drive. Combined with PC Transporter, the Drive System can also be used for storing up to 360K per disk of ProDOS programs and data.



- 5.25" 360K Single-Drive TransDrive** \$269
(expandable to 2 drives)
- 5.25" 360K Dual-Drive TransDrive** \$399
- 5.25" Half-Height 360K Drive** \$135
(additional drive for One-Drive System)



ColorSwitch \$44
(included with IIGs Installation Kit)
Contains 15 pin analog RGB output and automatically switches inputs between an analog version of PC Transporter RGB output and Apple analog RGB output.

Mastering DOS \$17.95

Most extensive and easy to understand guide using PC and MS-DOS we have seen. Cover price regularly \$19.95.

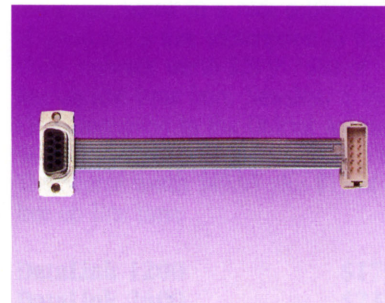


Sony RGB Monitor \$519

The finest quality RGB Trinitron monitor we have tested. Packed with features: displays NTSC composite color video, analog RGB, digital RGB, plus it's a remote-control, full cable-ready 13" television!



- Analog RGB Cable** \$39
(for use with Sony monitor)
- Digital RGB Cable** \$39
(for use with Sony monitor)



Digital RGB Adapter \$24
Contains 9 pin digital RGB connector that allows a digital RGB monitor cable to plug directly into PC Transporter.

Optional Heavy Duty Power Supply **\$69**

(Ile and II+ only)
Applied Engineering's heavy duty 6000 mA Power Supply. Fills needs of today's power user.



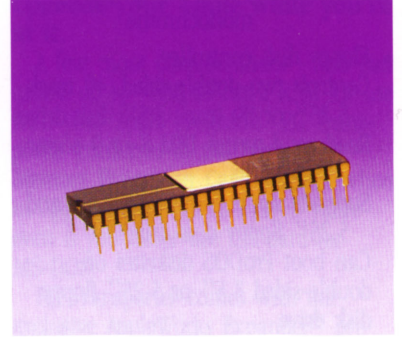
IBM-style Keyboard **\$139**

IBM-style Keyboard available for users who prefer to use real IBM-type keyboards with their IBM programs. Includes IBM Keyboard Cable. (Required for Apple II+.)



8087-2 Math Co-Processor Chip **\$279**

For super-fast number-crunching. 8MHz maximum clock rate. Plugs directly into 8087 chip socket on PC Transporter.



IBM Keyboard Cable **\$34**

Available for PC Transporter users who already have an IBM-style keyboard. (Required for Apple II+.)

Make your Apple speak IBM

PC Transporter		
RAM in	Ram in	
Apple mode:	IBM mode:	Price
768K	640K	\$679
Note: The IBM mode is 128K less because the PC Transporter uses 128K for system memory.		
IIGS Installation Kit		\$49
Includes ColorSwitch and drive cable.		
Ile/II+ Installation Kit		\$39
Includes drive cable, keyboard cable, video cable and speaker cable.		
PC Transporter Installation Video		
Included FREE in Installation Kits.		

DATA LINK™ 1200 AND 2400 MODEMS

Bring home a world of information ...from up to the minute flight schedules to whole libraries of research materials. Even download free software and games. Our DataLink 1200 and 2400 modems let your Apple IIGS, IIe or II+ communicate with other computers, download free software from networks and bulletin boards, access database services and more. For a remarkably low price.

The world at your fingertips.

With a DataLink modem, you'll be able to draw information from thousands of databases. Send and receive electronic mail—even overseas. Join clubs and bulletin boards to exchange software or solve computing problems with other Apple users. Download free public domain software. And share files with personal computers and mainframes.

Twice the speed.

At transmission speeds up to 2400 bps (bits per second) our new DataLink 2400 is capable of putting text on the screen faster than the human eye can follow. That means you can capture a great deal more material in less time than with 1200 bps modems. And *unlike other modems*, both DataLink modems come complete with powerful, easy-to-use communications software.

Complete communications software included.

Both our new DataLink 2400 and our DataLink 1200 modems feature AE's communications software - on disk and in ROM - everything needed to get you immediately up and running. Our powerful DataTerm™ software for the IIGS and IIe supports VT-52 screen emulation, macros, file transfers, on-line time display, recording buffer and more. It even handles hundreds of phone numbers for auto-dialing and log on. And for II+ and 64K IIe owners, our OnLine 64™ software has many of the same powerful features.

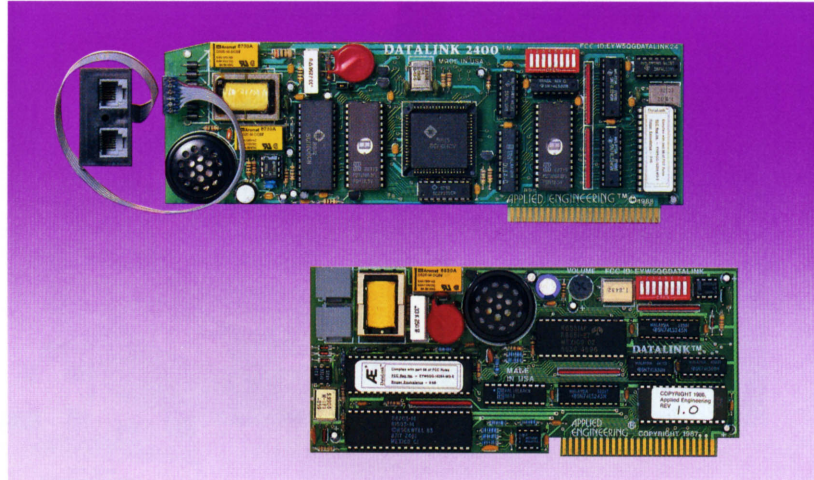
Worldwide compatibility.

The DataLink 2400 is fully compatible with Bell 103 and 212 protocols, as well as European protocol CCITT V.22 BIS, V.22 and V.21. It operates at varying transmission speeds from 0-300, 1200 and 2400 bps. Loaded with all the features of the new 2400 (except CCITT, DSR/DCD and non-

volatile ROM configurations), our DataLink 1200 modem operates at 0-300 and 1200 bps.

The new 2400, like our best-selling DataLink 1200, carries a full five year warranty and comes complete with two modular phone jacks for data and voice calls, a thoughtful feature that means fewer wires to connect. We also include an extra long telephone cable, in case your computer is across the room from your telephone jack. You

- PC Transporter (MS-DOS) compatibility
- Call progress detection electronically or with speaker (speaker has volume control)
- Built-in self test
- Two built-in phone connectors
- Phone cable included
- FCC certified design
- 5 year warranty - parts and labor
- Proudly made in the U.S.A.



DataLink 2400

DataLink 1200

can track the progress of calls either electronically or via on-board speaker. And built-in diagnostics reliably check transmission accuracy.

Packed with important features.

Both DataLink 1200 and 2400 modems include:

- Full Hayes AT compatibility
- Communications software in ROM for the IIe, II+ and IIGS
- Communications software on disk for the IIe and IIGS
- On-line help screens
- Point-to-Point, ASCII Express, Access II compatibility, in addition to AE's included DataTerm and OnLine 64 software
- Super Serial Card "Front End" for highest software compatibility (unlike some competitors)
- Adaptive equalization and descrambling
- Works in any slot of the IIe and II+ (except 0 & 3), and IIGS (except 3)
- Hardware configuration for DSR and DCD (2400 only)
- Auto - dial, auto - answer
- Non-volatile memory for modem configuration (2400 only)

\$204.90 in freebies.

We also throw in a nice collection of goodies - a free subscription to the GENie network worth \$29.95, \$60 of free on-line time from NewsNet, a free \$50 subscription to the Official Airline Guide and a fee-waived membership to The Source worth \$49.95 plus \$15 of free on-line time.

DataLink 1200	\$179
DataLink 2400	\$239

Simply the finest modems on the market for your Apple IIGS, IIe, or II+.

II+

IIe

IIGS

Laser

Franklin

SERIAL PRO™

Serial Pro™ is a powerful multifunction card for the IIe, II+, IIGs, Laser and Franklin computers. Serial Pro combines a powerful serial port for interfacing to either a printer, or a modem or other serial device, with a full function clock/calendar card. Serial Pro's serial port is compatible with virtually all letter quality and dot matrix serial printers, including Apple's ImageWriter and ImageWriter II. The serial port can communicate

help that makes it super easy. An on board battery stores your selections for over 20 years, but you can change them at any time.

Serial Port features:

- Fully Super Serial Card compatible but more versatile and easier to use
- Compatible with printers
- Compatible with modems
- Prints graphics to printer (without software)

Clock/calendar features:

- ProDOS, DOS 3.3 and AppleWorks compatible. Displays time and date on the AppleWorks screen.
- Automatically time and date stamps AppleWorks files
- 12/24 hour clock format
- 20 year auto-recharging nickel-cadmium battery
- Switch selectable real-time interrupts
- Built-in on-screen time and date setting (no software needed)
- Does not use phantom slots

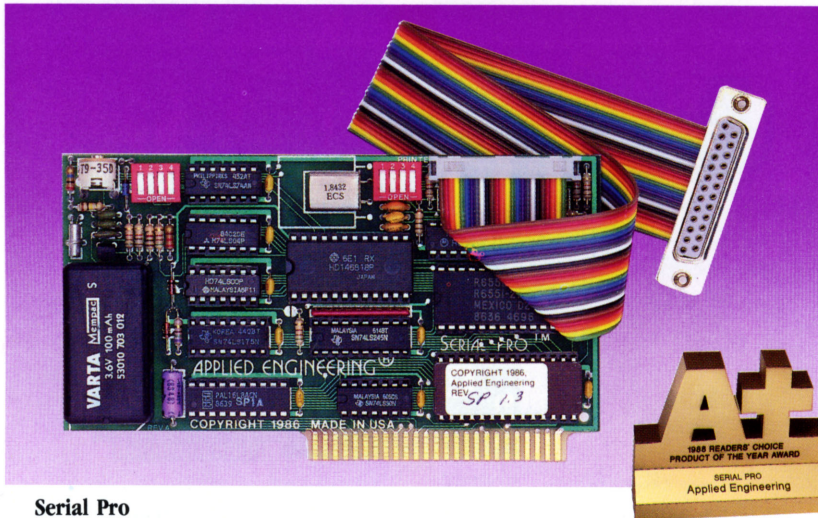
Serial Pro is perfect for Apple IIe, II+, Franklin and Laser owners in need of a serial port or clock/calendar or both. But unlike other multifunction cards on the market, Serial Pro does not use phantom slots. Other multifunction cards use phantom slots, meaning that other slots must be kept empty. Because Serial Pro doesn't use this technique, all the slots in your computer are useable.

Serial Pro comes complete with manual, cable, hardware and detailed instructions for connecting to all the leading printers and modems.

Serial Pro

\$139

*Serial port, clock
and calendar
in one.*



Serial Pro

with the fastest external modems at baud rates from 50 to 19,200.

Set-up is easy, because unlike other cards, there are no dip switches to program or disks to use. Serial Pro has a built-in set-up screen that allows all parameters to be set. And on-screen

- Baud rates from 50 to 19,200
- Variable word length, number of stop bits and parity selection
- Variable handshaking, linefeed and graphics selection
- Crystal controlled circuits are used to provide ultra accurate baud rates

II+

IIe

IIGs

Laser

Franklin

PARALLEL PRO™ AND BUFFER PRO™

Parallel Pro™

When you're trying to find the right parallel interface for your printer, look to Applied Engineering to bring you the best in quality and features.

Features:

- Compatible with Apple IIGS, IIe and II+ (works in any slot except 3)
- Fully compatible with ProDOS, DOS 3.3, Pascal 1.3, and CP/M
- Works automatically with virtually all software
- Supports almost all parallel printers including: Epson, IBM, Okidata, C. Itoh, NEC, Star Micronics, Toshiba, and more
- Conforms fully to the Centronic Standard
- Built-in control panel allows easy access to set-up information
- Automatic formatting of BASIC listings
- Built-in self test and Buffer Pro™ support
- Extensive graphics print capability for the Hi-Res, Double Hi-Res and the IIGS Super Hi-Res screens
- Buffer option available (see below)
- Includes 6-ft. cable for connecting to your printer

Buffer Pro™

Buffer Pro adds memory to Parallel Pro, freeing your Apple from running the printer. With Buffer Pro, you can continue to use your Apple while the printer is printing. To add Buffer Pro to Parallel Pro, simply unplug the cable on Parallel Pro and plug Buffer Pro where the cable was, then plug the cable onto Buffer Pro. That's it!

Features:

- Compatible with IIGS, IIe, and II+
- Fits in a IIGS with or without fan
- Adds approximately 32 to 256 pages of printer buffering
- User expandable using 64K or 256K RAM chips one chip at a time and in any combination. Each 256K chip adds approximately 32 pages (maximum of 8 chips)
- Connects directly to Parallel Pro

Parallel Pro

\$99

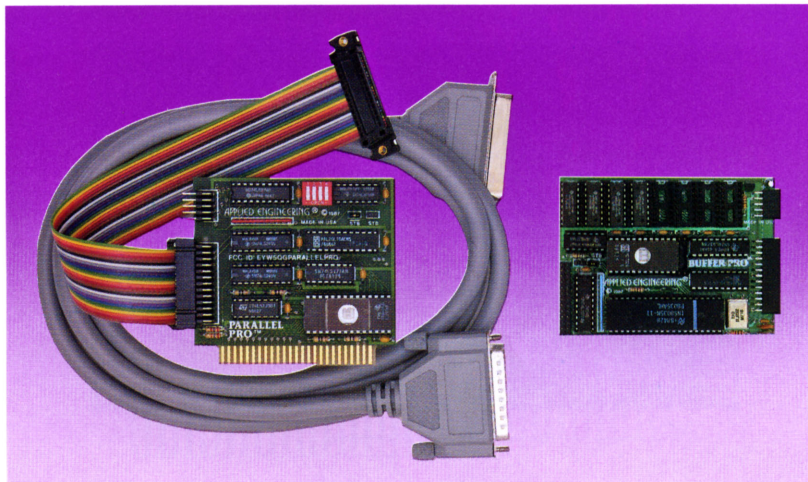
Buffer Pro Option:

- with 32-page buffer
- with 128-page buffer
- with 256-page buffer

\$109

\$169

\$239



Parallel Pro

Buffer Pro Option

- Works automatically with virtually all software
- May be paused or cleared with simple commands (unlike other buffers, you don't have to "shoot the computer" if you want to stop the print-out before it's done)

Both Parallel Pro and Buffer Pro come with a comprehensive manual, a 5 year warranty — parts and labor, and outstanding technical support if needed.

The most powerful Apple printer/buffer interface you can buy.

II+

IIe

IIGS

Laser

Franklin

TIMEMASTER H.O.™

The smart way to put the time and date on your II+, IIe and IIGs. Only Timemaster H.O.™ packs all the features of all the competition into one affordable card and makes that card totally ProDOS, DOS 3.3, PASCAL and CP/M compatible. And Timemaster is far superior to any other card for AppleWorks.

If you're using or writing software for other clock cards, you're still covered. Because the H.O. will auto-

programs in machine code, DOS 3.3, ProDOS, BASIC, PASCAL and CP/M.

The free programs include a computerized appointment book, a DOS dating program, interrupt programs and over 30 other programs that others charge extra for - or don't even offer. And all routines are installed in the System Library for easy use. You'll never use the Date command again.

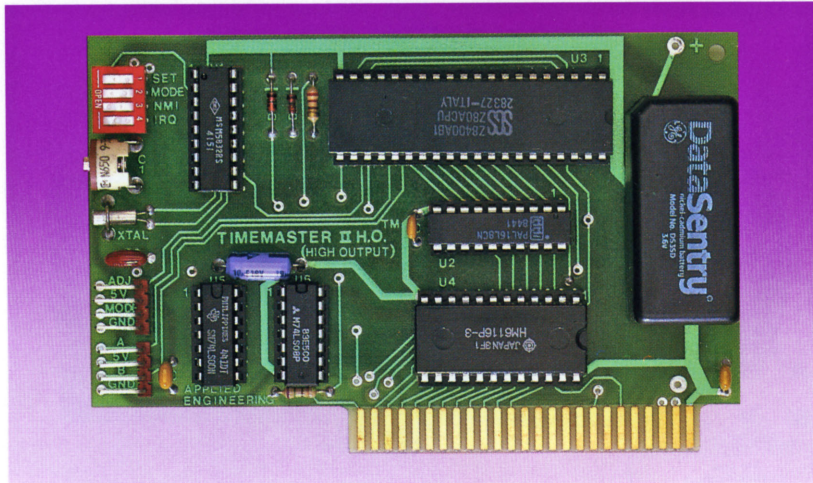
As a low-cost option, you can add true BSR remote control to the H.O.,

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, wakeup, and controlling your TV.

Features:

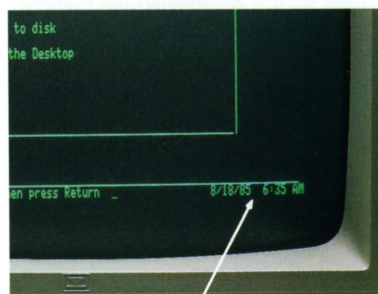
- The first clock that displays the date and time on the AppleWorks screen and database files
- Allows AppleWorks to time and date stamp all data files automatically
- Meets and surpasses all protocols as defined by Apple
- Totally ProDOS and DOS 3.3 compatible
- Time in hours, minutes, seconds and milliseconds
- 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 ProDOS 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 bus
- Eight software controlled interrupts so you can run two programs at once
- Digital I/O port for advanced applications
- Compatible with all of Apple's languages. Sample programs for machine code, Applesoft BASIC, CP/M and Pascal on 2 disks
- Timer lets you time any interval from 48 days long to the nearest millisecond
- Accuracy 0.00005%
- High quality P.C. board, gold-plated connector, all I.C.'s in high quality sockets
- Auto-recharging nickel-cadmium battery designed to last over 20 years
- 5 year warranty - parts and labor
- Proudly made in the U.S.A.

*All the features
of all the
competition
combined.*



matically emulate them. And the Timemaster adds 14 new commands to BASIC. The H.O. even comes complete with two disks full of sample

giving you remote control of up to 16 lights and appliances in your home or office. Our BSR X-10 sends its signals over regular 110 volt wiring, so your home is already wired. And the BSR is easy to program because it's controlled by firmware in ROM on the Timemaster H.O.



Timemaster H.O. is the first clock to display the date and time on the AppleWorks screen

Timemaster H.O.	\$99
BSR Option (may be added later)	\$29
BSR Command Console	\$39

II+

IIe

IIGs

Laser

Franklin

Enter the CP/M world with the new Z-80 Plus™ card from Applied Engineering and introduce your Apple to thousands of CP/M programs. Only the Z-80 Plus comes with standard CP/AM 5.1 software, the most advanced system for running Apple CP/M programs ever. Only CP/AM 5.1™ 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 runs older Apple CP/M programs too, down to Version 1.6 (2.2 is the most popular). With the Z-80 Plus you can run one of the largest bodies 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 RamWorks, up to 3072K is available to CP/AM as a RAMdisk; with RamFactor, up to 5120K. And each Z-80 Plus includes our CP/AM MEGDrive software, enabling IIe owners to use an extended 80 column card, or a RamWorks card as an ultra-fast RAMdisk enabling CP/M software to run 10 to 20 times faster. So fast acting software like WordStar and dBASE II become virtually instantaneous.

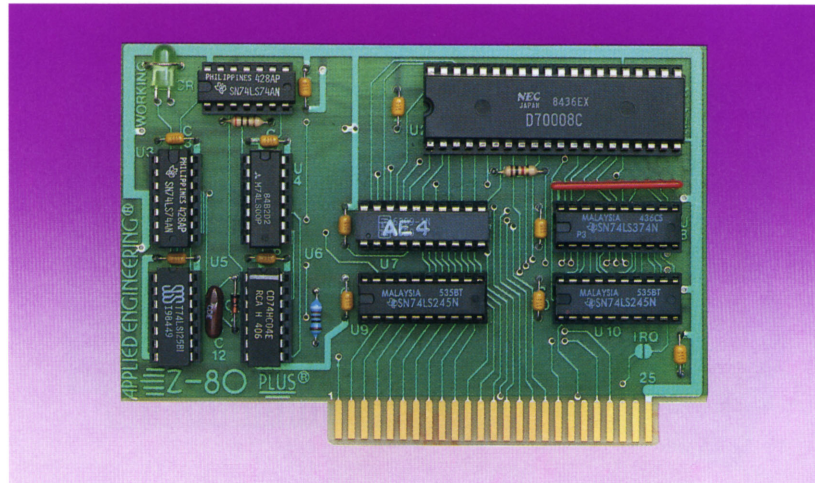
You'll have two computers in one and the advantages of both, all at an unbelievably low price.

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 and IIGs (runs nearly as fast in the II+ and Franklin)

- Green "CP/AM 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
- Compatible with 5.25" and 3.5" disk drives as well as the Sider hard disk
- The Z-80 Plus can access up to 3072K of RAMdisk memory (most programs only need 64K)
- Fast clock: 2MHz (Z-80B)
- Documentation included
- High quality P.C. board, gold-plated connector, all I.C.'s in high quality sockets
- Compatible with Apple II, II+, IIe and IIGs
- 5 year warranty — parts and labor
- Made in U.S.A.

With the Z-80 Plus, you can access one of the largest bodies of software in



Z-80 Plus

- Runs on any Apple II, II+, IIe or IIGs with at least 64K 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 Apple CP/M based software

existence. Two computers in one and the advantages of both, all at an unbelievably low price.

Z-80 Plus

\$149

*The world of
CP/M awaits.*

II+

IIe

IIGs

Laser

Franklin

SONIC BLASTER™

Every Apple IIGS was born with incredible sound potential in the form of a built-in Ensoniq 32-oscillator digital synthesizer chip. This chip produces up to 15 voices simultaneously and is used by professional musicians and studios to compose, synthesize and analyze.

The Sonic Blaster™, our full-featured stereo digitizer, records, amplifies and plays back in rich, full stereo. It's also capable of knocking your socks off

Once the data is recorded and digitized, it can be presented in a graphical format. You can actually zoom in to "see" what the sound looks like. And the zoom can be used in conjunction with the editing features to precisely manipulate any sound.

Sonic Blaster includes stereo VU meters so you can manually set the gain for optimum recording quality. The oscilloscope can also be used to

Stereo playback.

The Sonic Blaster's playback function gives you control over volume and playback rate. To reproduce sounds as they were recorded, match the playback rate with the sampling rate used when recording. Or try a faster or slower rate to create unusual effects.

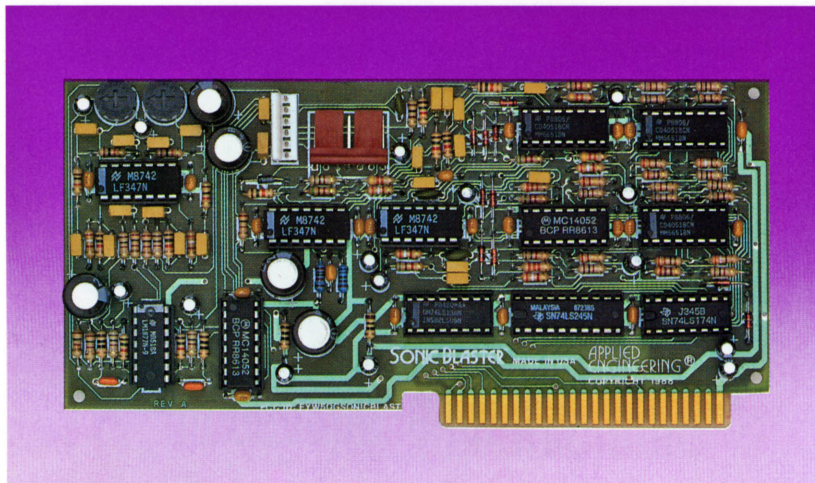
Sonic Blaster boosts the impact of all GS programs using the Ensoniq capability. Most GS games and programs like Tomahawk, 4th and Inches, Winter Games, Silent Service, Skate or Die, The Music Studio, Instant Music and The Music Construction Set come to life.

Sonic Blaster's built-in amplifier greatly enhances the GS's sound output. Use a variety of speaker configurations with your Sonic Blaster, including BOSE amplified speakers or unamplified standard speakers. Even connect your computer to your home stereo system.

Features:

- Stereo record
- Stereo playback
- Multi-pole active filtering
- Stereo output volume controls from software and hardware
- Stereo input adjustable through software from microphone level to speaker level
- Uses the Ensoniq A/D converter for stereo input
- Compatible with all software that uses the Ensoniq output
- GS menu driven software
- Easy-to-use Mac-like interface
- Minimum expansion memory required - 512K (1 MEG recommended)
- Standard select, cut, copy, paste and undo edit features
- Visual display of digitized sound
- On-screen oscilloscope to monitor inputs
- Auto gain function
- On-screen VU meter
- Playback, record and pause controls
- Advanced editing functions such as fade-in, fade-out, backwards, echo, silence and amplify
- Compatible with many existing sound file formats including AIFF (Apple Information File Format)
- Supports 2:1 and 2.67:1 file compression

*Unleash the
incredible sound
potential of the IIGS.*



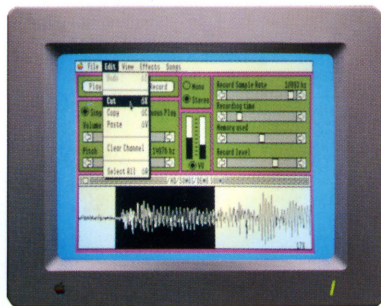
Sonic Blaster

when powering your favorite IIGS games.

You can record sounds from your home stereo, CD player, television or VCR and alter them with a full range of easy-to-use editing functions.

Stereo recording.

The Sonic Blaster features simultaneous left and right channel recording. A built-in oscilloscope helps you set input levels before recording to prevent "clipping" the signal. Or use the oscilloscope to visually analyze the inputted data without recording.



manually set the gain, or the computer itself can determine the gain with our built-in Auto Gain feature.

Adjust the record sampling rate to optimize between fidelity and available memory. The higher the sampling rate, the more memory required and the higher the fidelity. A slower sampling rate extends the available memory for less-critical sounds.

Impressive editing functions.

The Sonic Blaster gives you a new world of sound editing capabilities. Edit recorded sounds with familiar, "Mac-like", pull down menus and a host of functions like cut, paste, copy, amplify, reverse, fade-in, fade-out and echo. All with lightning fast response.

Sonic Blaster comes complete with powerful software we've designed to be easy to use. Pull down menus control all functions. Crisp, Super Hi-Res graphics make Sonic Blaster a delight for the eyes as well as the ears. Even choose your own screen colors and backgrounds to match the tunes you create.

IIGS

Sonic Blaster

\$129

AUDIO ANIMATOR™

Our new Audio Animator™ is a true MIDI I/O device, stereo digitizer and stereo playback machine...combined! Audio Animator transforms your Apple IIGs from a beep box into a boom box.

You get all the Sonic Blaster's great features, plus a few twists...like controlling MIDI compatible instruments, creating your own keyboard on the screen and precisely controlling levels with an included external mixer.

Stereo recording.

Audio Animator records left and right channels simultaneously and can record sounds from your own stereo, CD player, television or VCR, even a microphone! The built-in oscilloscope lets you control recording levels visually and analyze imputed data.

The zoom function permits you to "see" what your recorded sounds look like in a graphical format. Use the zoom function along with editing functions to make minute changes in the sound.

Sampling rates are fully adjustable. As with Sonic Blaster, you determine the optimal balance between desired fidelity and available memory.

Audio Animator has two dedicated Analog-to-Digital converters to sample at an extremely fast rate, and with sound quality near that of a compact disk. Far higher levels of fidelity are obtainable through our converters than are possible with the GS's Ensoniq chip alone.

Stereo playback.

Audio Animator's built-in amplifier, like that of the Sonic Blaster, greatly enhances the GS's inherent sound capability. The Audio Animator also accepts various speaker configurations, including amplified, unamplified or a direct LINE IN from your home stereo.

Audio Animator boosts all GS Ensoniq programs including The Music Studio, Instant Music, Diversi-Tune, Music Writer, The Music Construction Set and a host of new games. The Animator also has an adjustable playback rate for matching the recording rate or creating special effects.

Instrument palette.

Cut sounds directly from the sampler and paste them to the instrument palette. Then play the sounds - either on your GS with the on-screen simulated keyboard or on an external MIDI keyboard, guitar or horn.

MIDI interface.

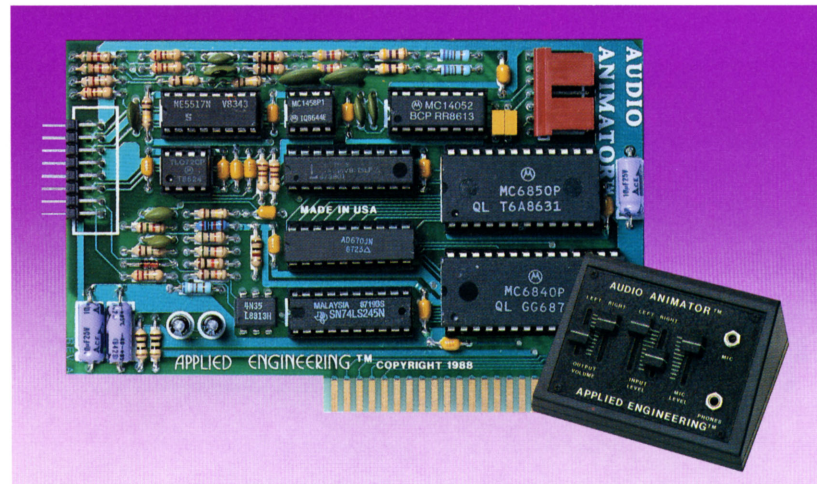
The Audio Animator includes input/output for MIDI (Musical Instrument Digital Interface) devices. Play and record melodies on a MIDI instrument, edit them and play them back through any MIDI compatible instrument.

Audio Animator comes complete with an external mixer to allow easy access to volume, record level, and microphone controls. Connect a drum machine, keyboard, stereo, CD player,

filters and a number of editing functions like cut, copy, paste, punch in, punch out and many more. And Audio Animator is fully compatible with Passport and other fine MIDI software.

Features:

- Passport compatible MIDI interface
- Very fast analog to digital converters
- Separate jacks for one microphone level input or two line level inputs



Audio Animator

even another computer...all without disturbing the GS. Connections include MIDI in, MIDI out and MIDI thru.

The high-speed serial link transmits at 31,250 bits per second, allowing you to work with several MIDI instruments at once. In fact, Audio Animator with its MIDI interface lets you daisy-chain up to sixteen machines!

The powerful software we include is mouse-driven and presents you with both pull-down menus and SUPER HI-RES graphics. Custom icons and bright colors make Audio Animator almost as much fun to see as it is to hear.



The MIDI portion of the software is an 8-track, 16-channel sequencer with separate channel record and playback

External Mixer

- Mixer has DIN connectors for MIDI in, MIDI out and MIDI thru
- Mixer has stereo headphone jack and two line level outputs for connecting to home stereo
- Compatible with all software that uses the Ensoniq output
- Minimum expansion memory requirement - 512K (1 MEG recommended)
- Visual display of digitized sound
- On-screen oscilloscope to monitor inputs
- On-screen VU meter
- Advanced editing functions such as fade-in, fade-out, backwards, echo, silence and amplify
- Compatible with many existing sound file formats including AIFF (Apple Information File Format)
- MIDI Sequencer software included free
- Advanced channel MIDI data filtering for both record and playback
- 8 track, 16 channel MIDI record
- MIDI quantization down to 1/32 resolution

Audio Animator

\$239

All of Sonic Blaster's features plus MIDI and an external mixer.

IIGS

PHASOR™

Phasor™ is a complete high performance stereo music, sound and speech synthesizer for the Apple IIe, II+ or IIGs. Phasor offers 12 musical and sound effect 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

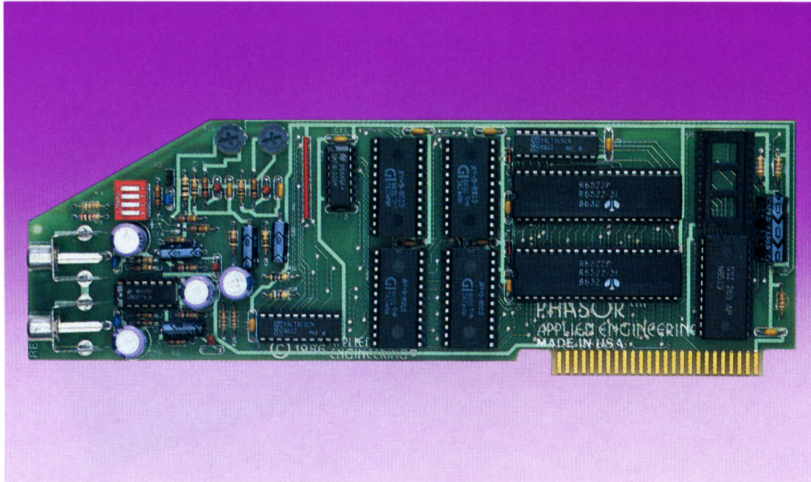
pounding sound to all of the better games like Skyfox, Under Fire, Willy Byte, Tactical Armor Command, Maze Craze, Ultima V and Silent Service; to name a few. Educational software like Music Construction Set (IIGe), Guitar Master, Music Star, Tell and Spell, Lelps and First Math are greatly enhanced by Phasor's power.

But even if you don't own any software, Phasor comes with a ton of entertaining and educational software

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 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, II+, IIGs (64K minimum), one disk drive and speakers
 - Software is RAM based when used with any standard RAM card for ultra-fast operation
 - 5 year warranty — parts and labor
- 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.

*Phasor— for the
thunderous,
booming power
you so desperately
need.*



Phasor

that Phasor automatically enhances and is recognized by more off-the-shelf software than any other 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

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 for your Apple. It adds a new dimension of exciting sounds to games, educational programs, music programs and programs you create yourself.

Phasor

\$169

II+

IIe

IIGs

Laser

Franklin

VIEWMASTER 80™

There's a good reason why Viewmaster 80™ has left the competition in the dust...total compatibility. From our free AppleWorks enhancement software to our famous warranty and complete technical support, Viewmaster 80 stands head and shoulders above any other 80 column card.

Each Viewmaster 80 includes our powerful AppleWorks enhancement software, allowing AppleWorks to run on the II+ with only 64K (or more) of memory. (We recommend the Ram-Factor memory card, but any compatible Apple memory card will work.) AppleWorks runs the expanded records and word processor lines, and added features like multi-disk saving, time and date display with any ProDOS clock and more.

Features:

- 80 characters by 24 lines
- Fully compatible with all Apple languages and software. Includes AppleWorks enhancement software
- Very sharp 7x9 character matrix with true descenders, both inverse and normal
- All on-screen editing functions are supported

- User definable cursor shape
- Compatible with Apple II, II+ and IIe
- 5 year warranty — parts and labor

TOTAL compatibility is the secret to the Viewmaster 80's great success. The Viewmaster 80 works with 80 column applications (including CP/M, Pascal, WordStar, MicroWriter II+, AppleWorks, Supertext 80, Zardax, Apple PI, Letter Perfect, dBASE II, VisiCalc, Multiplan, and hundreds of others).

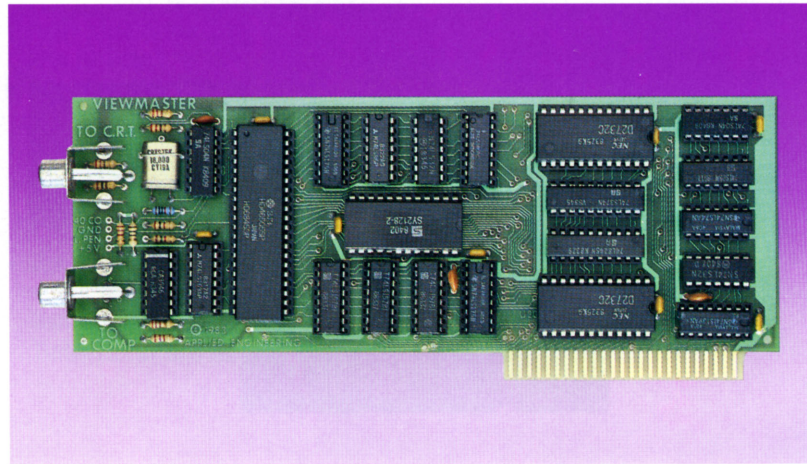
Viewmaster 80 delivers a super sharp, state-of-the-art display, with a 7x9

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 into 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.

Viewmaster 80

\$159



Viewmaster 80

*The definitive
80 column card.*

II+

Franklin

LOWERCASE ROM CHIP™

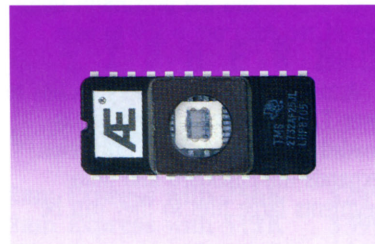
Add lowercase capability to your II or II+ (Rev. 7 or later motherboard) with AE's Lowercase ROM Chip™. The chip makes communicating easier by giving you the ability to use capital and lowercase letters in both written and modem-based communications. It is fully supported by AppleWriter and other word processing programs as

well as Applied Engineering's own OnLine 64 communications software, included with our DataLink modems.

The Lowercase ROM Chip simply replaces a chip on the Apple II+ motherboard.

Lowercase ROM Chip

\$24



Lowercase ROM Chip

II+

16K POCKET ROCKET RAM CARD™

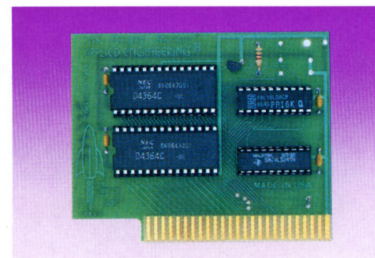
Features:

- Expands Apple II & II+ to 64K
- 16K memory expansion card for the Apple II and II+ fully compatible with Applesoft, CP/M and Pascal. Plugs into slot 0
- Lower power-reduced chip count
- Allows II+ to run AppleWorks when

used in conjunction with AE's Viewmaster 80

- Allows II+ to run ProDOS
- No jumper cable or chips to remove
- 5 year warranty — parts and labor

16K Pocket Rocket RAM Card \$99



16K Pocket Rocket RAM Card

II+

Z - R A M U L T R A™

Z-RAM Ultra™ fits neatly inside any IIc, new or old. Installation is easy, clear instructions show you how. You'll need a screwdriver and about 20 minutes.

Your Apple can become a computer you never dreamed it could be. Because the most exciting chapter in the Z-RAM history of turbo-charged IIc's has just been written. It's called Z-RAM Ultra. And it takes IIc expansion into a whole new realm.

saved on two or more disks. AppleWorks will now run about 10 times faster in your IIc with one disk drive than in other IIc's with two disk drives. Nothing else comes close to enhancing AppleWorks like this!

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 RAMdisk is compatible with Applesoft, ProDOS, DOS 3.3, Apple Pascal and CP/M. And

Only with Ultra 2 or Ultra 3:

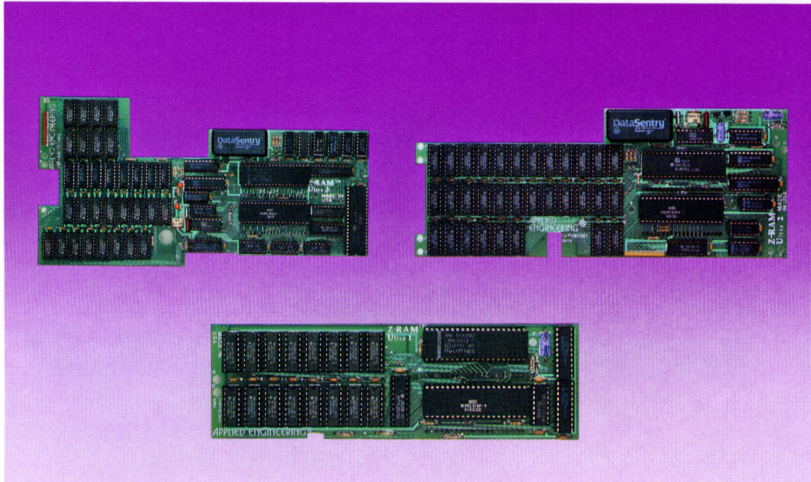
A built-in real-time clock displays the time and date on AppleWorks screens and files, and is fully ProDOS compatible.

With the Z-RAM Ultra card installed, your IIc is still your IIc only now you'll have that extra memory that AppleWorks and other programs need.

Features:

- Works in any IIc, new or old
- Up to 1 MEG memory (you choose how much) lets you store, load and run programs up to 20 times faster
- Expands and accelerates all memory intensive programs, including AppleWorks
- No jumper wires, clips or drive removal—so installation takes only a few minutes and a screwdriver
- Optional 65C816 16-bit processor plugs right in with no component changes
- Printer buffer lets you continue working while printing AppleWorks files
- Real-time clock displays time and date on AppleWorks screens and files, and is ProDOS compatible for use with other ProDOS software
- Run CP/M programs with Z-RAM Ultra 3's built-in Z-80B microprocessor

Turbo-charge your IIc with features galore.



Z-RAM Ultra 3

Z-RAM Ultra 1

Z-RAM Ultra 2

The AppleWorks amplifier.

With any Z-RAM Ultra, your AppleWorks word processor capacity will instantly increase from 7,250 lines to over 22,500 and the maximum number of records from 6,350 to over 22,500.

Available desktop memory rockets to over 720K with *all* of AppleWorks loaded into RAM. Z-RAM Ultra even expands the clipboard and auto-segments large files so they can be

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!

Only with Ultra 3:

But before you start panting over all that extra memory, don't forget that the Z-RAM Ultra 3 card has a built-in high speed Z-80 microprocessor that allows you to run CP/M programs like WordStar, dBASE II, Turbo Pascal, Microsoft BASIC, FORTRAN and COBOL and over 5,000 other CP/M programs. So Z-RAM Ultra 3 not only makes Apple programs run better and faster, it lets you run MORE programs.

Z-RAM is 100% compatible with all IIc software and hardware including the mouse, second drive, modem and printer. Z-RAM is easily handled by the IIc power supply as power consumption is kept very low by using custom integrated circuits and a patent pending power saving design.

Z-RAM comes complete with manual and software, and a 5 year warranty — parts and labor.

Z-RAM Ultra 3 with ZeroK	\$289
Z-RAM Ultra 3 with 256K	\$399
Z-RAM Ultra 3 with 512K	\$549
Z-RAM Ultra 3 with 1 MEG	\$849
Z-RAM Ultra 2 with ZeroK	\$209
Z-RAM Ultra 2 with 256K	\$319
Z-RAM Ultra 2 with 512K	\$469
Z-RAM Ultra 2 with 1 MEG	\$769
Z-RAM Ultra 1 with ZeroK	\$139
Z-RAM Ultra 1 with 256K	\$249
Z-RAM Ultra 1 with 512K	\$399
Optional 65C816 16-bit Chip	\$79

IIc

Enter the world of CP/M with the Z-80TM and introduce your IIC to programs like WordStar, dBASE II, Turbo Pascal and thousands of others.

The Z-80c is neatly engineered to turn itself on only when a CP/M disk is being used. So your IIC remains a IIC if you wish to run ProDOS. And the Z-80c comes standard with 5.1 software, the most advanced system for running Apple CP/M programs ever. The Z-80c 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.

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 card, 5.1 operating system, utility disk and an understandable owner's manual.

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.

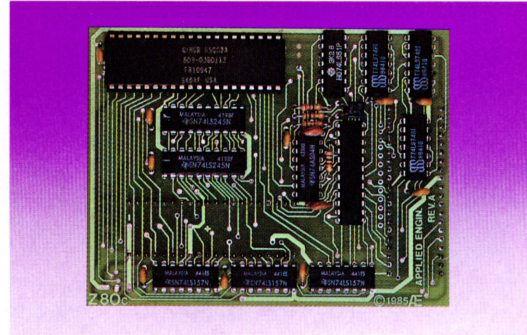
Features:

- Totally compatible with all Apple 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 PAL 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-80c will allow you to run: dBASE II, WordStar, SpellStar, Turbo Pascal and all other Apple

- CP/M based software
- Fast clock: 2MHz (Z-80B)
 - Documentation included
 - High quality P.C. board, gold-plated connector
 - 5 year warranty — parts and labor

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

Z-80c \$159



Z-80c

Enter a whole new world of software titles — CP/M.

IIC

R A M E X P R E S S TM

Ram ExpressTM is Applied Engineering's new, fully compatible memory card for the IIC Plus and original IIC's (those with memory expansion connectors). Available in user-upgradeable 256K, 512K and 1 MEG sizes, Ram Express adds the memory you need, and a whole lot more.

AppleWorks Enhancement

With Ram Express, AppleWorks word processor lines rocket from 7,250 to more than 22,500 and the maximum number of records zooms from 6,350 to more than 22,500! Ram Express even expands the clipboard and automatically segments large files so they can be saved on two or more disks. And with Ram Express, you'll run AppleWorks 10 times faster with one disk drive than an ordinary IIC could with two disk drives.

Ram Express is also a high speed, solid state disk drive, loading and saving your programs more than 20 times faster. Copy a disk in one pass by simply inserting and removing the original, and inserting a blank disk. We even include a graphic memory test to keep you running smoothly.

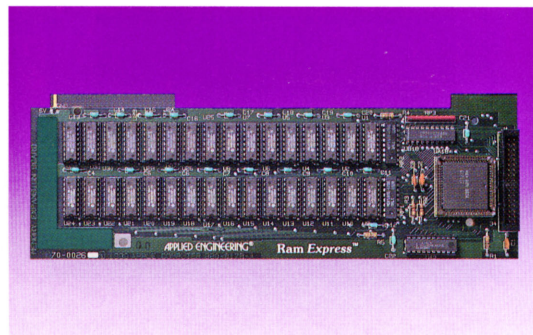
And installation in the IIC Plus is easier than ever. Remove a few screws, lift the cover and plug Ram Express into the connector.

Optional clock.

Ram Express's optional clock displays the time and date on-screen and automatically time and date stamps AppleWorks files. The Clock Option is even compatible with

Apple's memory card for the IIC.

- Ram Express with 256K \$249**
- Ram Express with 512K \$399**
- Ram Express with 1 MEG \$699**
- Clock Option \$59**



Ram Express

IIC

IIC Plus

12 BIT, 16 CHANNEL A/D

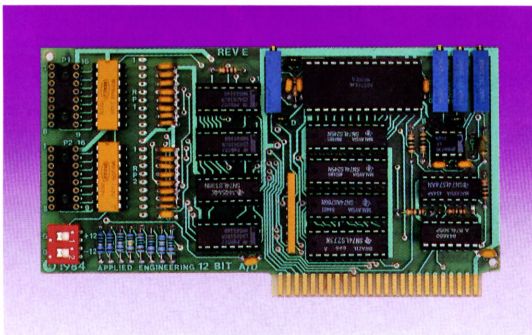
Features:

- 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

+/-250mV, +/-100mV, +/-50mV, or +/-25mV

- On-board jumpers are easily configured to allow unipolar operation for range doubling
- Very fast conversion (25 micro seconds)

- 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



- Analog input resistance greater than 1,000,000 ohms
- LASER-trimmed scaling resistors
- Low power consumption through the use of CMOS devices
- The user connector has +12 and -12 volts on it so you can power your sensors

- 8 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: +/-5V, +/-2.5V, +/-1.0V, +/-500mV,

- 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

Our latest A/D card features true 12 bit resolution and data acquisition rates of up to 25,000 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.

12 Bit, 16 Channel A/D \$279

- II+
- IIe
- IIgs
- Laser
- Franklin

SIGNAL CONDITIONER

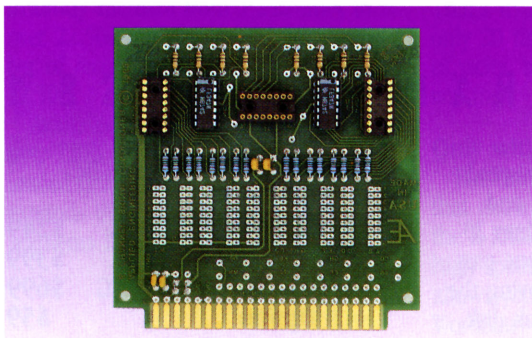
Our 8 channel signal conditioner is designed for use with our A/D

any gain or offset. For example: an input 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 to provide the best possible contact with the A/D via ribbon cable. The Signal Conditioner can be powered by your Apple or from an external supply.

- 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)

Signal Conditioner \$79



converter. This board incorporates 8 F.E.T. op-amps, which allow almost

Features:

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

- II+
- IIe
- IIgs
- Laser
- Franklin

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
- Super-fast conversion time
- Very easy programming
- Many analog ranges
- Manual contains sample applications
- Works in any slot of the 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 missing 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 an 8 bit, 8 channel memory buffered, data acquisition system on a single Apple plug-in card. It consists of a high speed 8 bit succes-

sive 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.

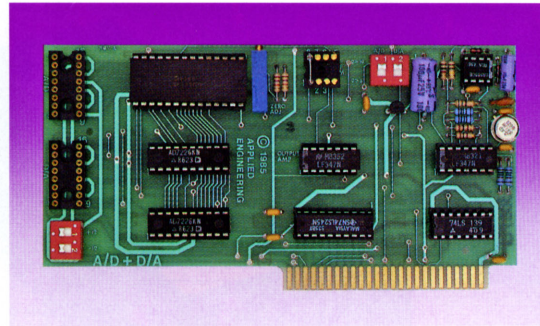
D/A specifications:

- 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 need for calibrating the 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.

A/D + D/A

\$199

- II+
- IIe
- IIgs
- Laser
- Franklin

Features:

- Provides 4, 8-bit programmable I/O ports
- Any of the 4 ports can be programmed as an input or an output port
- Two TTL ports, two CMOS
- 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.

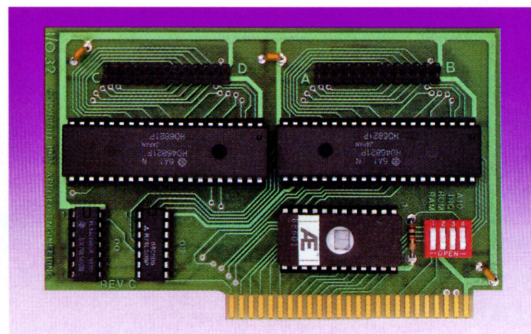
This on-board firmware makes your programming a snap from BASIC. Of course, if you want to control the I/O 32 directly you can.

So whether you're a be-

ginning BASIC programmer or an expert at machine language programming, the I/O is the perfect solution to any control application.

I/O 32

\$89



- II+
- IIe
- IIgs
- Laser
- Franklin

HEAVY DUTY POWER SUPPLY

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 at right 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
5.25" disk interface	400
3.5" disk interface	500
Hard disk interface	700
Typical 1 MEG RAM Card	1100
RamFactor with 1 MEG	400
PC Transporter with 768K & 8087 Chip	1075
1 MEG RamWorks III	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

- User installed in five minutes
- 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: +5 @ 6000mA, +12V @ 2500mA, -12V @ 1000mA, -5V @ 1000mA
- Ripple: 10mV typ.
- Full load operating temperature: 32° to 122°F (0° to 50°C)
- Full 1 year warranty

Heavy Duty Power Supply \$69



Heavy Duty Power Supply

5.25" HALF-HEIGHT DISK DRIVE

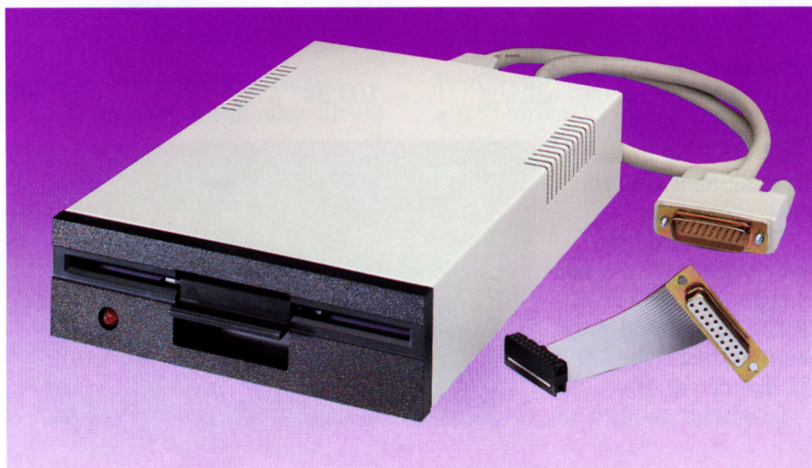
- Fully compatible with all Apple software
- Compatible with IIe, IIc, II+ and IIgs
- Special pulse motor makes it accurate, reliable and fast
- Requires adapter cable for use with Apple Disk II Controller Card
- 143K formatted, 35 tracks, 16 sector

- Super quiet
- Full 1 year warranty — parts and labor
- Complete with 24" long cable that plugs directly into your controller card

5.25" Half-Height Disk Drive \$149
(specify computer when ordering)

- **Disk II-style Controller Card** available if needed; handles 2 disk drives. Compatible with IIe, II+ and IIgs

- **Adapter Cable** adapts drive for use with Disk II-style Controller Card
Now included FREE with drive.



5.25" Half-Height Disk Drive

\$69

II+

IIe

II+

IIe

IIc

IIgs

Laser

Franklin

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Prices Subject to Change Without Notice

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SHIPPING	
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Product	Price	Page
12 Bit, 16 Channel A/D	\$279	26
16K RAM Card (Pocket Rocket)	\$99	23
16 Bit 65C816 Option - RamWorks	\$159	9
16 Bit 65C816 Option - Z-RAM Ultra	\$79	24
2 MEG Plus Expander		
1 MEG	\$729	8
2 MEG	\$1279	8
5.25 Half-Height Disk Drive	\$149	28
512K Expander	\$399	8
8087-2 Math Co-processor	\$279	14
A/D + D/A	\$199	27
AE Extended 80 Column Card	\$119	11
Audio Animator	\$239	21
BSR Command Console	\$39	18
BSR Option	\$29	18
Buffer Pro		
32K	\$109	17
128K	\$169	17
256K	\$239	17
Clock Option - Ram Express	\$59	25
ColorSwitch	\$44	14
CP/AM MEGDrive Software	\$29	9
DataLink 1200	\$179	15
DataLink 2400	\$239	15
Digital RGB Adapter	\$24	14
Gel/Cell Battery	\$24	7
GS 2 MEG Expander		
1 MEG	\$699	6
2 MEG	\$1249	6
GS-RAM		
ZeroK	\$139	6
256K	\$249	6
512K	\$399	6
1 MEG	\$699	6
1.5 MEG	\$999	6
GS-RAM Plus		
ZeroMEG	\$169	6
1 MEG	\$699	6
2 MEG	\$1249	6
3 MEG	\$1799	6
4 MEG	\$2349	6
5 MEG	\$2899	6
6 MEG	\$3449	6
Heavy Duty Power Supply	\$69	28
I/O 32	\$89	27
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IBM-style Keyboard (includes cable)	\$139	14
Ile, II+ Installation Kit	\$39	14
IIGS Installation Kit	\$49	14
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Mastering DOS	\$17.95	14
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Parallel Pro	\$99	17
PC Transporter	\$679	12
PCPI APPLI-CARD Software	\$29	9
Phasor	\$169	22
RamCharger	\$179	4
Ram Express		
256K	\$249	25
512K	\$399	25
1 MEG	\$699	25
RamFactor		
ZeroK	\$189	4
256K	\$299	4
512K	\$449	4
1 MEG	\$749	4

Product	Price	Page
RamFactor Expander Kit	\$29	4
RamFactor 4 MEG Expander		
ZeroMEG	\$199	4
1 MEG	\$729	4
2 MEG	\$1279	4
3 MEG	\$1829	4
4 MEG	\$2379	4
RamKeeper	\$189	7
RamWorks Basic		
ZeroK	\$119	9
64K	\$219	9
256K	\$229	9
512K	\$379	9
RamWorks III		
ZeroK	\$139	8
64K	\$239	8
256K	\$249	8
512K	\$399	8
1 MEG	\$699	8
1.5 MEG	\$1079	8
3 MEG	\$1959	8
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Signal Conditioner	\$79	26
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Single-Drive System	\$259	14
Dual-Drive System	\$399	14
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TransWarp GS	\$399	5
VC Ile Expander	\$29	9
Viewmaster 80	\$159	23
"Y" Adapter Cable for RamFactor	\$24	4
Z-80 Plus	\$149	19
Z-80 Plus Microsoft RAM Drive	\$29	19
Z-80c	\$159	25
Z-RAM Ultra 1		
ZeroK	\$139	24
256K	\$249	24
512K	\$399	24
Z-RAM Ultra 2		
ZeroK	\$209	24
256K	\$319	24
512K	\$469	24
1 MEG	\$769	24
Z-RAM Ultra 3		
ZeroK	\$289	24
256K	\$399	24
512K	\$549	24
1 MEG	\$849	24

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A word about prices:

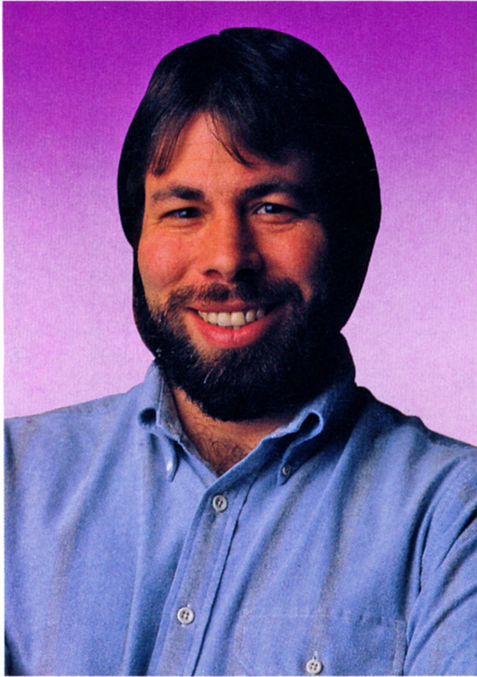
We have made every effort to list prices as accurately as possible. However, certain products (especially those using memory chips) are subject to fluctuations in price. Please call Applied Engineering for current prices.



APPLIED ENGINEERING

—STEVE WOZNIAK

*Apple Inventor
and Co-Founder*



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