inCider
A+
Apple II / Macintosh
COMMUNICATIONS PUBLICATION
October 1991

DESIGN IT YOURSELF

CAD Software for Armchair Architects



EDITORS' CHOICE, P. 72

SimAnt
Keep 'Em Down on the Farm

USA $3.95
Canada $4.95

EQUAL ACCESS
Special-Needs Products Break Down Barriers

GRAPHICS TIPS
Building the Perfect Color Palette

REVIEWS

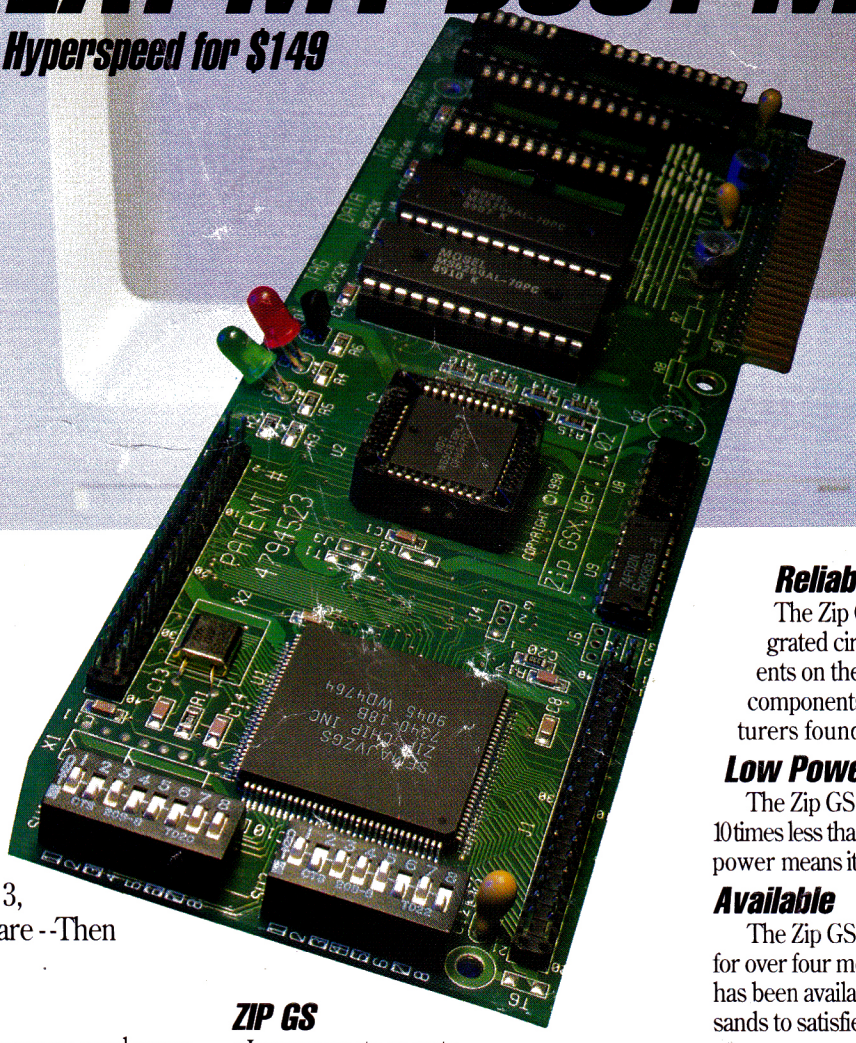
- Q-Drive vs. Resource Central
- Desert Storm
- RoboSport
- Dragon Wars GS

10
0 74470 12066 7

Dr. Kenneth Buchholz

EAT MY DUST Mac...

Hyperspeed for $149 — **GS+ Magazine**



If You Use...

- Appleworks GS
- Managing your Money
- Printshop GS
- HyperCardGS
- Springboard Publisher
- DeluxePaint
- Quicken • Publish it 3,

or any other GS software --Then you need a Zip GS.

Here's Why...

To use powerful programs you need a powerful computer. Apple Computer left one thing out of the IIGS when they designed it...speed. The Zip GS puts the speed back in. The Zip GS comes standard with 8 K cache memory and runs at a very speedy 7 Mhz. The Zip GS gives you all the speed you need now and in the future because it's expandable. You will never have to buy another accelerator card again. All upgrades are available now.

Can you imagine the time you will save having your GS running up to 10 Megahertz faster. Appleworks performs like you always thought it should, recalculations in the blink of an eye. Word processing faster than on the new line of Macintosh computers. Nibble magazine said it this way "Apple Computer take note: this chip makes a full featured GS word processor faster than several Macintosh word processors running on a monochrome display." (monochrome display is the fastest) Hallelujah! **ZIP GS DELIVERS!**

ZIP GS

- Is very easy to operate.
- Needs no special boot-up. •

Provides Macintosh speeds for your GS• Is compatible with all GS hardware and software. • Uses 1/10 the power of competing boards.• Address all memory. •Upgradable to 64 K cache memory.• 16 variable speeds at the touch of a key. • 30 day money back guarantee and a 1 year warranty.• Upgradable to 10 megahertz.• Fully DMA compatible.

Installation

Anyone can install the Zip GS in a matter of minutes. To help with the installation, we include an animated pictorial instruction manual which gives detailed instructions on installation and operation.

Upgradable

The Zip GS can be upgraded at any time. Zip Technology has available upgrade kits that boost the speed to 10Mhz.! We will be happy to do the upgrade labor for free within 48 hours.

Reliable

The Zip GS has only one custom integrated circuit. The other three components on the Zip GS are the same reliable components from the same manufacturers found in your GS Computer.

Low Power

The Zip GS requires only 120 ma of power - 10 times less than other accelerators. The low power means it will always run cool.

Available

The Zip GS has been available and shipping for over four months. In the short time that it has been available, we have delivered thousands to satisfied customers around the world.

Special Introductory Offer

The Zip GS is priced at $199.00 retail. During ths introductory offer the Zip GS is only $149.00, a savings of $50.00.

ZIP GS Introductory Offer $149.95

8Mhz upgrade	add only	$29.95
9Mhz upgrade	add only	$59.95
8K cache upgrade	add only	$19.95
32K cache upgrade	add only	$49.95
Zip GS--10 Ultra Fast 10 Mhz		call

Risk Free Offer/Money Back Guarantee

If you are not satisfied with the performance of your GS Plus, simply return it in the original box within 30 days for a refund.

Order Today Call Toll Free:

1 800-937-9737

Checks, VISA, Mastercard, American Express and Discovery cards accepted.

Now Shipping Standard Air By FEDERAL EXPRESS

TECHNOLOGY™ 5601 West Slauson Avenue, Suite #190 • Culver City, CA 90230 • Phone: (213) 337-1313 • FAX: (213) 337-9337

All product names are trademarks of their manufacturer

Circle 189 on Reader Service Card.

Is Your Apple II® Already Obsolete?

NO, YOU JUST NEED THE NEW GENERATION OF SOFTWARE!

Feature for feature your Apple II is still one of the best computers ever for home use and the Apple IIGS® is probably THE best computer for home and school ever produced. With a new generation of software your Apple II will carry you well into the 90's; and SOFTDISK PUBLISHING™ is actively developing software for both the Apple II and Apple IIGS. That's why our software subscriptions can be so valuable to you.

A PRICE YOU'LL APPRECIATE

SOFTDISK for your Apple II can be delivered to your home monthly, postage paid, for $6.65 a month or $19.95 for three months. **SOFTDISK G-S** for your IIGS is only $9.97 a month or $29.95 for three months. If you're a IIGS owner, we'll offer you a special combo price of $39.95 for three months. Satisfaction guaranteed!

WHAT IS SOFTDISK™ FOR THE APPLE II (e, c, c+, +, GS)?

SOFTDISK is a monthly software collection designed for the Apple II. Every month we send you two 5¼" disks or one 800K disk packed with original new programs for your Apple II. What kind of software? Practically anything you can do with an Apple II computer. After 120 issues of **SOFTDISK**, our editors really know how to provide you with Apple II software you can use.



HERE'S WHAT THE EXPERTS ARE WRITING ABOUT SOFTDISK AND SOFTDISK G-S:

"In a world where real bargains are hard to find, SOFTDISK is a very pleasant surprise..."
—Electronic Learning

" Programs, desk accessories, fonts, games, . . . , SOFTDISK G-S is a great value"
—InCider A+

"...this is a full-blown software package with beautiful graphics and an extensive help session . . . it's an economical way to add interesting software to your library."
—Apple IIGS Buyer's Guide

WHAT IS SOFTDISK G-S™ FOR THE APPLE IIGS?

SOFTDISK G-S is a monthly software collection designed for the Apple IIGS. **SOFTDISK G-S** is true 16-bit and takes advantage of the special sound and graphics capabilities that only the Apple IIGS supports. Plus, your Apple IIGS is able to run both **SOFTDISK** and **SOFTDISK G-S**. And since they have different programs, get both at a special combo price!

QUALITY ORIGINAL SOFTWARE

Don't confuse **SOFTDISK** and **SOFTDISK G-S** with shareware or public domain software. Our low price is made possible by our large circulation, not by inferior programs. There are no extra fees to pay for your software or **FREE TECHNICAL SUPPORT.** The programs on **SOFTDISK** and **SOFTDISK G-S** are developed by the world's best program designers.

WE HAVE HUNDREDS OF LETTERS LIKE THIS:

"Dear Softdisk: Your Softdisk G-S is great! I am very impressed, the moving icons, interesting columns, matter-of-fact reviews, up to date system software, spiffy user interface, etc. I will definitely renew when the time comes."

So there you have it. Original software, outstanding quality, and all at a price you can easily afford. Would you subscribe to a disk packed with programs, postage free? If you're not sure, why not take advantage of this special offer and try just 3 issues - no risk - no obligation to continue. As a bonus, we will also send you **FREE**—200 Print Shop® graphics. If you're not completely satisfied, we'll refund your money. No questions asked.

CALL FREE 1-800-831-2694
OR FAX THIS COUPON TO 318-221-8870

SOFTDISK PUBLISHING
monthly software

CONTENTS OF SOFTDISK #114*

MOVIE MINDER- Appleworks® database to organize your videotape library.
MONTHLY MYSTERY II- Very fishy program. A neat screen saver.
CATACOMBS- A four-way scrolling double hi-res game.
M.A.L.T.- A label utility to print labels for your disks, videotapes, etc.
PS GRAPHICS- More PRINT SHOP graphics from our staff.
PLUS- Professor Know-it-all, Readers Write, Gaming Forum.

CONTENTS OF SOFTDISK G-S #13*

REFLEXION - A puzzle game with clean graphics and fun sounds.
PS VIEWER-IMAGES- Features school images and some cool aliens.
HACK ATTACK LEVEL SET- New levels for Arkanoid™ game.
JUKEBOX - Three incredible new songs. Sit back and listen.
SPORTS CLIP ART - Two pages of detailed sports figure clip art.
FRESHSCRIPT FONT- A great GS font in four point sizes.
SPENCER'S PAGES- A sensational page layout template,"Lantern Light".
G-ESSENCE- A column about the current state of the Apple world.

FREE

YES! Rush my **FREE** bonus, **200 Print Shop Graphics**, and start my three-month trial subscription to **Softdisk G-S** and/or **Softdisk**, postage paid. Make check or money order payable to **Softdisk Publishing in U.S. funds** (LA residents, add 4% state sales tax).

Check one:
❑ **Softdisk G-S** (For the Apple IIGS) **$29.95**, Can./Mex. $34.95, Other For. $37.95
❑ **Softdisk** (For the Apple II) **$19.95**, Can./Mex. $24.95, Other For. $27.95
❑ **Combo–Softdisk G-S & Softdisk $39.95**, Can./Mex. $49.95, Other For. $55.95

Check Disk Format: ❑ Two 5.25" disks ❑ One 3.5" disk

Name _____
Address _____
City _____ State _____ Zip + 4 _____
Phone # _____

❑ Discover ❑ Visa/MC ❑ AmEx ❑ Payment Enclosed (U.S. funds only).
Card# _____ Exp. Date _____
Signature _____

SOFTDISK PUBLISHING • P.O. Box 30008 • Shreveport, LA 71130-0008
318-221-8718 • **1-800-831-2694** **IN1091**

This offer good until June 30, 1992. Allow 4 to 6 weeks for delivery of first issue.

Softdisk G-S: 768K—One 3.5" drive Required; 1.25 Meg. Two 5.25" drives Recommended. **Softdisk:** 64K Required; 128K Recommended.
Softdisk and Softdisk G-S are trademarks of Softdisk Publishing, Inc. Macintosh, Apple II, Apple IIGS and AppleWorks are registered trademarks of Apple Computer, Inc. Print Shop is a registered trademark of Brøderbund Software. Arkanoid is a trademark of Taito.

*Available as a back issue.

7JD008

Circle 291 on Reader Service Card.

Quality Computers Apple Overnight 1-800-443-6697

Quality Computers™
POWER FOR PERFORMANCE

Your complete Apple II source

ENHANCE

FREE! One year subscription



Enhance is Quality Computers' bi-monthly informative-technical-entertaining newsletter. *Enhance* gives you the kind of information you need to make your Apple the effective work/educational tool it was designed to be, like product reviews and comparisons, new product announcements, news, and two special sections, Enhancing Education — written by teachers for teachers, and Computer Club Corner — designed to spark interest in User Groups across the country.

Enhance also includes our catalog — full of all the hardware and software you need for your Apple II. Quality Computers catalog includes detailed product descriptions and MONEY-SAVING COUPONS.

Quality Computers has been publishing *Enhance* for over 4 years. It's free to all QC customers, or you can call for your free subscription today!

". . . an excellent publication."
Wanda Bullion
SJAUG User Group, Cherry Hill NJ

"Now that we have Enhance by our side, we feel confident our Apple II will be a member of our family for a long time to come."
Doug & Sandy Fish
Rhinelander, WI

". . . you, the editors, are doing an excellent job. In each issue of Enhance I get answers that help me out.
James T. Clark
Wyoming, MI

Get ENHANCE free!

Join the hundreds of thousands who have enjoyed *Enhance* for over 4 years. Get your free subscription today!

Name _____

Address _____

City _____ State _____ Zip _____

Phone (_____) _____

Clip and mail to: QUALITY COMPUTERS, P.O. Box 665, St. Clair Shores, MI 48080. Or call 1-800-443-6697

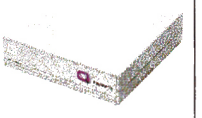
HARD DRIVES

QUALITY COMPUTERS

40 MEG. w/SCSI	499.95
100 MEG. w/SCSI	699.95
200 MEG. w/SCSI	1,295.95
45 MEG. Removable	699.95
CD ROM	Call
IIc Drive	Call

APPLIED ENGINEERING

40 MEG. Vulcan	569.95
100 MEG. Vulcan	949.95



QUALITY COMPUTERS
The Q Drive is the best SCSI hard drive available. Automatically formats itself for IIe or IIGS, and comes with 15 MEG of free software.
40 w/o SCSI card .. 389.95
See page 4

SCSI INTERFACE CARDS

APPLE

Apple High-Speed	109.95

C.V. TECHNOLOGIES

RamFAST/SCSI w/256K	189.95

MEMORY CARDS

APPLIED ENGINEERING

RAMWORKS III	
256K	139.95
512K	159.95
1 MEG.	199.95
RAMFACTOR	
256K	169.95
512K	189.95
1 MEG.	229.95
Z-RAM ULTRA II	
256K	189.95
512K	209.95
1 MEG.	249.95
RAM EXPRESS II	
256K	149.95
512K	169.95
1 MEG.	209.95
GS-RAM PLUS or ULTRA	
1 MEG.	199.95
2 MEG.	259.95
3 MEG.	319.95
GS-RAM III	
1 MEG.	139.95
2 MEG.	199.95
4 MEG.	319.95

CHINOOK

4000 GS	
1 MEG.	149.95
2 MEG.	209.95
4 MEG.	329.95

C.V. TECHNOLOGIES

GS MEMORY BOARD	
1 MEG.	149.95
2 MEG.	209.95
4 MEG.	329.95

HARRIS LABS

GS SAUCE	
1 MEG.	149.95
2 MEG.	199.95
4 MEG.	299.95

SEQUENTIAL SYSTEMS

MEG 80 (IIe)	
256K	74.95
512K	99.95
1 MEG	129.95

MEMORY CHIPS

APPLE II

256K (bank)	19.95
256Kx4 (set of 2)	19.95
1 MEG. (bank)	49.95

MACINTOSH

1 MEG. SIMMS	49.95
2-4 MEG. SIMMS	Call
Mac Classic Modules	Call
Zipps	79.95

DISK DRIVES

APPLE

3.5" (IIe, II+)	309.95
3.5" (IIc Plus, IIGS)	319.95
Controller	49.95
Unidisk Controller	59.95

APPLIED ENGINEERING

AE 3.5"	199.95
AE 3.5" High-Density	239.95
AE 5.25"	139.95

AMR

AMR3.5" 1.4 MEG.	199.95
AMR 5.25"	129.95

LASER

Laser 3.5"	149.95
Laser 5.25"	99.95
Laser UDC	49.95

MEMORY



APPLE II MEMORY
256K 19.95
256Kx4 ..... 19.95
1 MEG. 49.95

MACINTOSH MEMORY
1 MEG. SIMMS 49.95
Mac Classic ..... Call
ZIPPS 79.95

PRINTERS

APPLE

ImageWriter II	459.95
StyleWriter (Mac)	459.95

HEWLETT-PACKARD

DeskJet 500	579.95

PANASONIC

Panasonic 1180	199.95
Panasonic 1191	249.95
Panasonic 1124i	349.95
Panasonic 1624	449.95

PRINTER INTERFACE CARDS

APPLIED ENGINEERING

Parallel Pro	79.95
32K Buffer Pro Option	89.95
Serial Pro	89.95

ORANGE MICRO

Grappler 9 Pin	84.95
Grappler Plus	79.95
NEW! Grappler+300	159.95

SMT

Printech	29.95

THIRDWARE

Fingerprint GSi	89.95
Fingerprint Plus	89.95
Fingerprint G+ or SS w/cable	59.95

XETEC

SuperWriter 924	64.95

MODEMS

APPLIED ENGINEERING

DataLink 2400 (Internal)	159.95
DataLink Express	179.95
w/MNP5 &Send-FAX	219.95

SUPRA CORP.

SupraModem 2400	99.95
w/MNP5	179.95
SPECIAL! SupraModem 2400, Cable, and TIC	134.95

MONITORS

12" Amber or Green Monochrome	99.95

APPLE

Apple RGB	459.95

MAGNAVOX

Magnavox RGB	299.95
Custom Cable (GS)	19.95

INPUT DEVICES

APPLE

AppleMouse IIe	119.95
AppleMouse IIc	99.95

CH PRODUCTS

Roller Mouse	75.95
Mach III Joystick	29.95
Mach IV Plus Joystick	62.95
Flightstick	47.95

EDMARK

TouchWindow	275.95

KENSINGTON

Turbo Mouse	109.95

KEYBOARDS

IBM-Style Keyboard	79.95
IIGS/Mac ADB Keyboard	129.95
Numeric Keypad IIe	34.95

KURTA

Kurta Graphics Tablet	319.95

LASER

Laser Mouse (IIe, IIc)	49.95

MOUSE SYSTEMS

IIGS ADB Mouse	79.95

THUNDERWARE

LightningScan GS	199.95
LightningScan (Mac)	385.95

VITESSE

Quickie Scan (IIe, IIGS)	199.95



QUALITY COMPUTERS
Get the facts before you buy a hard drive — get the Hard Drive Buyers' Guide. Packed with info and statistics.
Hard Drive Buyers' Guide 6.00

SOUND & GRAPHICS HARDWARE

APPLE

Apple Video Overlay Card	429.95

APPLIED ENGINEERING

Sonic Blaster	98.95
Audio Animator	179.95

DIGITAL VISION

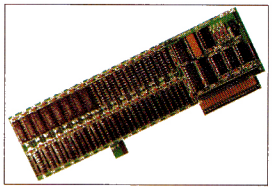
ComputerEyes IIe	99.95
ComputerEyes IIGS	195.95

Circle 136 on Reader Service Card.

Quality Computers Apple Overnight 1-800-443-6697

Quality Computers™
POWER FOR PERFORMANCE

We'll meet or beat any nationally advertised price*



C.V. TECHNOLOGIES
Expand your RAM with this DMA compatible IIGS memory card. Its unique piggyback connector lets you use your existing 1 MEG Apple Memory Expansion card, 4 MEG GS Juice Plus, or 4 MEG Chinook RAM 4000 for added memory. Don't throw memory away! Just add more!

GS MEMORY BOARD 149.95



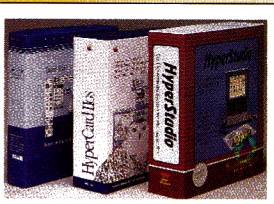
ABRACADATA
With the Design Your Own Home series you can draw floor plans or side views with architectural scales, grids and overlays. Use the stud/beam repeater to calculate lumber. Dozens of architectural symbols included. Versions available for Apple II, IIGS, Macintosh and IBM.

Design Your Own Home..... from 49.95



BYTEWORKS
Learn to program with the Orca/C compiler and the Learn to Program Tutorial. Includes complete C libraries, extension for IIGS Tool Box and built-in debugger. Easy and fun!

Orca/C 79.95
Learn to Program Bundle 119.95



HYPERMEDIA
Hypermedia is a creative environment where even non-programmers can bring graphics, sound and text together, in an interactive and interconnected way.

HyperStudio GS 82.95
HyperCard GS 79.95
Tutro-Tech (IIc, IIe, IIGS, Laser 128) 149.95

• School Editions/Lab Packs •
•Teacher Bonus Program •
• Overseas Orders Accepted •

PASSPORT DESIGNS
MIDI Interface 99.95

STREET ELECTRONICS
Echo II 109.95

COMPUTERS

APPLE
IIGS CPU w/1 MEG 799.95

LASER
Laser 128EX 387.95
Laser 128 Color System 510.95



QUALITY COMPUTERS
Complete management system for your hard drive. Includes Launcher, Backup/Restore, Index program, ProDOS Guide, and more.
EasyDrive 39.95

ACCESSORIES

APPLE
IIe Enahancement Kit 59.95

APPLIED ENGINEERING
TransWarp IIe 89.95
TransWarp GS 219.95
TransWarp GS w/32K 289.95
TransWarp GS Upgrade 84.95
Conserver 77.95
Power Supply 79.95
Power Supply IIGS 89.95
TimeMaster H.O. 78.95
ViewMaster 80 124.95
Z-80 Plus/Z-80c 119.95
FastMath 119.95

KENSINGTON
System Saver IIe 59.95
System Saver GS 69.95
Copy Stand 39.95
Anti-Glare Filter 39.95
Dust Cover 11.95

MISCELLANEOUS
Cables (most) 14.95
Extended 80 Col. Card 24.95
Switchboxes from 24.95
Keyboard Skins 19.95
3.5" Diskettes (10) 8.95
5.25" Diskettes (10) 6.95
Ribbons from 3.95

NITE OWL
IIGS Battery Kit 14.95

QUALITY COMPUTERS
Power Supply (IIe) 59.95

SMT
No Slot Clock 29.95

ZIP TECHNOLOGY
Zip GS 179.95

HYPERMEDIA

APPLE
HyperCard IIGS 79.95

ROGER WAGNER
HyperStudio GS 82.95
Lab Pack 449.95
X-Commands 35.95
Clip Art Vol. 1 or 2 19.95
Clip Sounds 19.95

TECHWARE
Tutor-Tech (All Apples) 149.95
Iraq Stack 39.95

WORD PROCESSING/ DATA BASE/ SPREADSHEET

BEAGLE BROS.
BeagleWrite 48.95
BeagleWrite GS 59.95

BRØDERBUND
Bank Street Writer Plus 49.95

CLARIS
AppleWorks 3.0 169.95
10 Pack 949.95
AppleShare version 1,089.95
AppleWorks GS 199.95
10 Pack 1,139.95

MICROSOFT
MicroSoft Word (Mac) 279.95
MicroSoft Write (Mac) 82.95
MicroSoft Excel (Mac) 329.95

SENSIBLE SOFTWARE
Sensible Grammar 52.95
Sensible Speller 79.95
Bookends 74.95

STONE EDGE
DB Master Pro 189.95

WESTCODE
InWords (OCR) 79.95

WORD PERFECT
WordPerfect IIe or IIGS 104.95



QUALITY COMPUTERS
Full-featured, affordable communication. Includes comprehensive macro language, dozens of terminal emulations, and more!
TIC 39.95

BUSINESS & FINANCE SOFTWARE

ACTASOFT
Alpha Check Plus 32.95
Payroll Plus 32.95

INTUIT
Quicken 38.95

MANZANITA
BusinessWorks Bundle 249.95
BusinessWorks Payroll 99.95
System Manager 79.95

MECA
Managing Your Money 99.95

NOLO PRESS
Will Maker 34.95

COMMUNICATION SOFTWARE

Q LABS
TIC 39.95

INSYNC
NEW! ProTERM 3.0 79.95
School Pack 279.95

BEAGLE BROS.
Point to Point 59.95

APPLIED ENGINEERING
ReadyLink 59.95

IF YOU DON'T SEE IT IN THIS AD CALL

Circle 136 on Reader Service Card.

EDUCATIONAL SOFTWARE

ORANGE CHERRY — TALKING SHOOLHOUSE
Talking ABC's GS 38.95
Talking Classroom GS 38.95
Talking USA Map GS 38.95
Talking Money GS 38.95
Talking Multiplication & Division GS 38.95
Talking Speller I GS 39.95

THE LEARNING COMPANY
Reader Rabbit 24.95
Talking Reader Rabbit GS 34.95
Math Rabbit 24.95
Children's Writing & Publishing Center 34.95
Think Quick 34.95

BRØDERBUND
Carmen World 25.95
IIGS version 29.95
Macintosh version 29.95
Carmen USA, Europe, Time, or World GS 29.95
The Playroom 24.95
Macintosh version 29.95
The New Print Shop 29.95
IIGS version 36.95
Macintosh version 36.95
Katie's Farm or McGee 24.95
McGee at the Fun Fair 24.95
Geometry GS 54.95
Kid Pix (Mac) 29.95
Science ToolKit 54.95
Modules 1 or 2 27.95
Sim City (Mac) 32.95
Sim Earth (Mac) 42.95

WEEKLY READER
Sticky Bear Numbers 24.95
Talking Sticky Bear ABC's 29.95
Sticky Bear Typing 32.95
Sticky Bear Math 24.95
Sticky Bear Reading 24.95

MECC
Calendar Crafter GS 32.95
Fraction Munchers 24.95
Number Munchers 24.95
Word Munchers 24.95
Oregon Trail 24.95
USA GeoGraph GS 54.95
World GeoGraph GS 54.95

DAVIDSON
AlgeBlaster Plus 29.95
Grammar Gremlins 29.95
MathBlaster Plus 29.95
MathBlaster Mystery 29.95



QUALITY COMPUTERS
RepairWorks rescues you from the grief of damaged AppleWorks files by recovering and repairing those files. InCider Editors' Choice.
RepairWorks 34.95

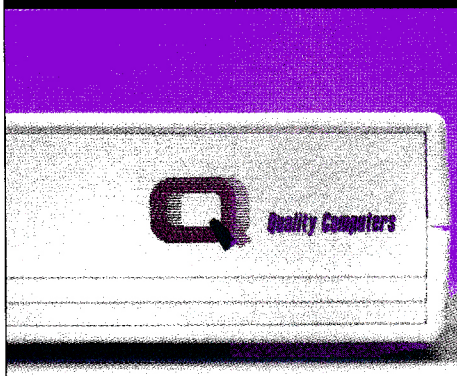
Read 'n Roll 34.95
Spell It Plus 32.95
Speed Reader 32.95
Team Reading 174.95

MINDSCAPE
Crossword Magic 4.0 34.95

SOFTWARE TOOLWORKS
Mavis Beacon Typing 27.95
IIGS version 33.95
Macintosh version 33.95

TIMEWORKS
Evelyn Wood Dynamic Reader 24.95

HARD DRIVE • APPLE II • MAC



SIMPLY THE BEST

As the Apple hard drive leader, we've sold and serviced every hard drive on the market. We've shipped them out, and we've seen them come back - in droves. We've listened to thousands of complaints and processed hundreds of returns.

Finally, those days are over. We are proud to announce a hard drive we trust so much that we put our name on it - the Q Drive.

Why do we trust the Q Drive? Simply, we demanded the best, and we got it:

THE BEST INTERNAL MECHANISM. Other companies sell hard drives with poor quality internal mechanisms to keep their costs down. We didn't settle for that. Ours are fast (25ms), quiet, reliable, and incorporates the latest hard drive technology, including a voice coil actuator for faster head positioning, and track buffering for quick data access.

THE BEST COMPATIBILITY. We demanded SCSI compatibility. With SCSI you get complete compatibility with all present and future Apple products, as well as almost any new system you get, whether it's Apple, Macintosh, or IBM. The Q Drive comes with the Apple High-Speed SCSI card, standard, or the RamFAST/SCSI card on request.

THE BEST DOCUMENTATION. The Q Drive's plain-English manual is the most complete available. It not only covers installation and set up, but also hard drive basics, ProDOS, pathnames, subdirectories, GS/OS, the Finder, backups, maintenance, and troubleshooting. There's even a glossary of hard drive terminology.

EASIEST TO USE. The Q Drive's software makes setting up a breeze. It instantly determines which Apple it's running on and configures the Q Drive appropriately. The latest system software is built-in, along with the Finder or ProDOS 8 Mini-Selector, and 15 MEG of the best public domain software available. The Q Drive even performs diagnostics, and can install EasyDrive for you, automatically.

THE BEST SERVICE AND SUPPORT. The Q Drive is backed by the Quality Computers Technical Support staff - the best in the business. It comes with a hassle-free 30-day money back guarantee, and a 1-year limited warranty. Plus, should your Q Drive ever fail, you can count on 72-hour average service time, and complete data recovery in most cases.

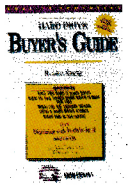
THE BEST PRICE. We priced the Q Drive to make it one of the most affordable hard drives available. Hardware, software, support, and price make the Q Drive the best Apple hard drive value. Take one for a test drive today!

TOP 10 REASONS WHY THE Q DRIVE IS YOUR BEST CHOICE

1. Comes complete with the Apple High Speed SCSI Card or RamFAST/SCSI Card (add $70).
2. Comes with free 15 MEG library of great public domain software.
3. Comes with the latest system software: GS/OS, ProDOS 8, the Finder, and a Mini-Selector
4. Instantly recognizes your computer (Apple IIe or IIGS) and automatically configures itself.
5. Comes with the most complete documentation in the industry. Not only will you learn how to operate your Q Drive, you'll learn how it and other hard drives work.
6. 100% SCSI compatible so it works on any Apple IIe, IIGS or Macintosh.
7. Backed by the fastest, most comprehensive service plan in the industry.
8. Hassle-free 30-day money back guarantee, and a 1-year limited warranty.
9. The best internal mechanism.
10. Attractive, compact case compliments your system, whether it sits under your monitor, on its side, or anywhere you want it. 9-3/4" x 10" x 2-1/2"

"The Q Drive is fantastic! Super-fast, quiet, formats itself, and a super 15 MEG software base — what a bonus!
Howard J. Dillon
Las Vegas, NV

"... the Q Drive software is so easy to use that it practically sets up the drive itself."
inCider Magazine



Undecided about a hard drive? Get the Hard Drive Buyer's Guide. It has everything you need to make an informed hard drive purchase, including our exclusive Hard Drive Demonstration Software, so you can feel the power and speed of a hard drive before you buy one. (Shipped overnight to most locations)

No other drive gives you all this at such a low price.

Don't settle for less!

MEG.	w/o Apple SCSI	w/Apple SCSI
40	389.95	499.95
100	589.95	699.95
200	1,189.95	1,295.95

ALSO AVAILABLE!
- 45 MEG Removable
- Tape Backup
- IIc Drives
- CD-ROM Drive

VISA MasterCard

Quality Computers™
POWER FOR PERFORMANCE

20200 Nine Mile Road • Box 665
St. Clair Shores, MI 48080
SALES: 1-800-443-6697
Tech. Support: (313) 774-7740
Cust. Service: (313) 774-7200
FAX: (313) 774-2698

VICE PRESIDENT/GROUP PUBLISHER — Paul Boulé

EDITOR IN CHIEF — Dan Muse
EXECUTIVE EDITOR — Eileen T. Terrill
SENIOR EDITOR — Paul Statt
ASSOCIATE EDITOR — Carla SlatonBarker
ASSOCIATE EDITOR — Cameron Crotty
SPECIAL-PRODUCTS MANAGER — Janet Cote
WEST COAST EDITOR — Jeff Cable
CONTRIBUTING EDITORS — Cynthia Field, Gregg Keizer, Joe Kohn, Ruth K. Witkin

DESIGN

ART DIRECTOR — John Sizing
ASSISTANT ART DIRECTOR — Dianne K. Ritson
PRODUCTION MANAGER/DESIGNER/AD GRAPHICS — Elizabeth Auer

ADVERTISING
Eastern Sales Office

ASSOCIATE PUBLISHER/NATIONAL SALES MANAGER — Dale Strang (800) 441-4403
SALES REPRESENTATIVE — Diane Maguire (800) 441-4403
ADVERTISING COORDINATOR — Mary Hartwell (800) 441-4403
ADMINISTRATIVE ASSISTANT — Lisa Benway-Caron

Western Sales Office

WESTERN SALES MANAGER — James Burns, 2421 Broadway, Suite 200, Redwood City, CA 94063, (415) 363-5230

MARKETING SERVICES/PROMOTION

DIRECTOR OF MARKETING — Peg Brown
MARKETING ASSISTANT — Rita Rivard

CORPORATE PRODUCTION

PRODUCTION DIRECTOR — Sue Gross
MACINTOSH COORDINATOR — Doreen Means

IDG COMMUNICATIONS/PETERBOROUGH

PRESIDENT — Roger Murphy
VICE PRESIDENT MANUFACTURING/OPERATIONS — Dennis Christensen
VICE PRESIDENT CIRCULATION/PLANNING — Bonnie Welsh-Carroll
DIRECTOR OF TECHNOLOGY RESEARCH — Jeffrey D. DeTray
SINGLE-COPY SALES DIRECTOR — Linda Ruth (800) 343-0728
NEWSSTAND PROMOTION MANAGER — Debbie Walsh
CIRCULATION DIRECTOR — Megan Lane
ASSISTANT CIRCULATION MANAGER CUSTOMER SERVICE — Laurie K. Seamans (800) 289-0619
DIRECTOR OF CREDIT, SALES AND COLLECTION — William M. Boyer
AUDITS AND STATISTICS — Cecile Giguere
FOUNDER — Wayne Green

inCider/A+ supports a forum on America Online. For information on obtaining appropriate software, call Quantum Computer Services at (800) 227-6345 x5290 or 5291.

The Audit Bureau

inCider/A+ (ISSN #1054-6456) is published monthly by A+ Publishing, a division of IDG Communications, 80 Elm St., Peterborough, NH 03458. Phone: (603) 924-0100. Second-class postage paid at Peterborough, NH, and additional mailing offices. (Canadian second-class mail registration number 9590.) Subscription rates in U.S. are $27.97 for one year, $43 for two years and $59 for three years. Foreign orders must be prepaid in U.S. funds drawn on a U.S. bank. One year only: Canada $37.97 (price includes GST, #12603840S), Mexico $37.97, foreign surface mail $47.97, foreign air mail $82.97. Nationally distributed by International Circulation Distributors. **Postmaster:** Send address changes to *inCider/A+*, Subscription Services, P.O. Box 58618, Boulder, CO 80322-8618. (Send Canadian changes of address to *inCider/A+*, P.O. Box 1051, Fort Erie, Ontario 12A 5N8.)

Circle 136 on Reader Service Card.

Quality Computers Apple Overnight 1-800-443-6697

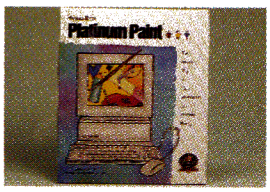
Quality Computers™
POWER FOR PERFORMANCE

We accept school P.O.s by phone, mail or fax



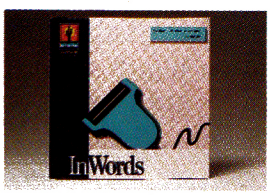
SOFTSPOKEN
CrossWorks, from SoftSpoken, copies and converts files either way between Apple II and IBM, and translates the formats. CrossWorks exchanges AppleWorks files with MicroSoft Works, WordPerfect, Lotus 1-2-3, dBase and other popular MS-DOS programs via universal cable (included) or modem.

CrossWorks 69.95



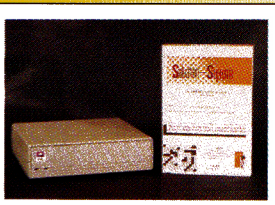
BEAGLE BROS.
Platinum Paint, from Beagle Bros, includes graphic editing features that are easy-to-use and incredibly fast. Compose paintings, signs or color illustrations, import clip art, colorize scanned images, and more! Whatever your graphic needs are, you can do it with Platinum Paint.

Platinum Paint 59.95



WESTCODE
With InWords, from WestCode Software, and a hand-held scanner, you can scan virtually any printed information — just as if you typed it from the keyboard — only faster. Enters up to 500 words/minute. Req. Apple IIGS or enhanced IIe w/512K, and Quickie or compatible scanner.

InWords 79.95
InWords + Quickie Scanner 268.95



VITESSE
Salvation Supreme, from Vitesse, is the total hard-drive volume utility for the Apple IIGS. It includes a backup utility, a virus detector and cure, a comprehensive hard drive management system, a fast, thorough hard drive optimizer, and a file repair/recovery utility.

Salvation Supreme 99.95

• Technical Support •
• Free Enhance Subscription •
• The Largest Selection •

ENTERTAINMENT SOFTWARE

QUALITY COMPUTERS

Three Stooges GS	14.95
Rocket Ranger GS	14.95
Star Saga: One	14.95
Alien Mind GS	14.95
Monte Carlo GS	14.95
Tower of Myraglen GS	14.95
S.D.I. (Mac)	14.95
King of Chicago (Mac)	14.95
ANY 3 FOR	***36.95***



GS GAMES SPECIAL!

Three Stooges 14.95
Rocket Ranger 14.95
Star Saga: One 14.95
Alien Mind 14.95
Monte Carlo 14.95
OR ANY 3 ..... 36.95

OTHER GAMES

Battle Chess GS	32.95
Crylian Mission/Scenario	44.95
Crystal Quest GS	32.95
The Duel: Test Drive IIGS	32.95
Grand Prix Circuit GS	28.95
Hunt for Red October	22.95
Jack Nicklaus Golf GS	32.95
Tetris	27.95
Xenocide GS	32.95

GRAPHICS SOFTWARE

ABRACADATA

Design Your Own Home	45.95
IIGS version	59.95

BAUDVILLE

8/16 Paint (IIe, IIc, IIGS)	49.95
Award Maker Plus	29.95
Libraries	each19.95

BEAGLE BROS.

GS Font Editor	29.95
Platinum Paint GS	59.95

BIG RED COMPUTER CLUB

PS Lover's Utility Set	27.95
Labels, Labels, Labels	24.95

BRØDERBUND

Bannermania	24.95
Kid Pix (Mac)	29.95
The New PrintShop	29.95
IIGS version	36.95
GS Companion	29.95
Libraries	each 16.95
GS Libraries	each 24.95
VCR Companion	34.95

SEVEN HILLS

Font Factory GS	29.95
GraphicWriter III	89.95

TIMEWORKS

Publish It! 4	89.95



QUALITY COMPUTERS
A rich harvest of more than 300 customization options for AppleWorks 2.0, 2.1, and 3.0. Easy to install and de-install as you wish.

SuperPatch 8.0 ..... 34.95

BEAGLE BROS. TIMEOUT SERIES

DecisionPak	89.95
PerformancePak	69.95
StylePak	79.95
MacroEase	25.95
DeskTools, FileMaster, PowerPack, SideSpread, TextTools, or Thesaurus	32.95
QuickSpell, SpreadTools, or UltraMacros	40.95
SuperFonts, SuperForms Outliner, or Telecomm	42.95
ReportWriter	48.95
Graph	52.95

UTILITIES & LANGUAGES

BEAGLE BROS.

Companion Plus	32.95
GS Desk Accessories	34.95
Program Writer	32.95

BYTEWORKS

Orca/DesignMaster	39.95
Orca/PASCAL, Orca/M, or Orca/C	79.95
Orca Learn to Program	119.95
Talking Tools	39.95

CENTRAL POINT

Copy II Plus	25.95

KITCHEN SINK SOFTWARE

Amazing Window Grade Sheet	39.95

MICOL

Advanced BASIC IIe	59.95
Advanced BASIC IIGS	89.95

Q LABS

RepairWorks	34.95
NEW! SuperPatch 8.0	34.95
RAMUP, EasyDrive, or TIC	39.95
Ruth Witkin's Best	24.95
Q Learning System	179.95
Matrix Maker	59.95

SENSIBLE SOFTWARE

ReportCard II	42.95

SEVEN HILLS

Independence	29.95
SuperConvert	24.95

SOFTSPOKEN

CrossWorks	69.95

VITESSE

Salvation Series Exorciser, Deliverance, or Bakkup	29.95
Renaissance	34.95
Wings	49.95
Supreme (All 5)	99.95
NEW! Harmonie 2.0	32.95

INSTRUCTIONAL

1,001 Things to do with Your Apple IIGS	12.95
Hard Drive Buyer's Guide	6.00
Using AppleWorks GS	15.95
AppleWorks Made Easy	15.95
Print Shop Handbook	15.95

BUSINESS HOURS

Sales — 1-800-443-6697
Mon-Fri 9AM-8PM Eastern
Sat 10AM-4PM Eastern

Support — (313) 774-7740
Mon-Fri 10AM-12/1PM-5:30PM Eastern

Service — 1-800-443-6697
Mon-Fri 9AM-5PM Eastern

POLICY

- We ship via Airborne Express, UPS, DHL, and US Mail. Saturday deliveries available. If order is split, we pay freight on balance of items. Add $3.95 for C.O.D. certified.
- RETURNS: All defective or mis-shipped items may be returned within 30 days for replacement. Items returned with damaged or incomplete packaging will be charged packaging fees. No refunds on software items (unless otherwise specified). Refunds subject to rental fees. Ask about our Rental Program!
- Prices subject to change without notice.
- We accept school P.O.'s by mail, phone or FAX (313) 774-2698.

Quality Computers™
POWER FOR PERFORMANCE

VISA DISCOVER MasterCard American Express Card

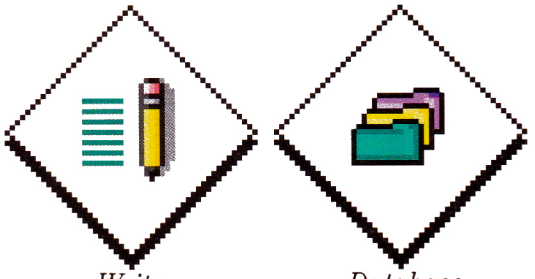
1-800-443-6697

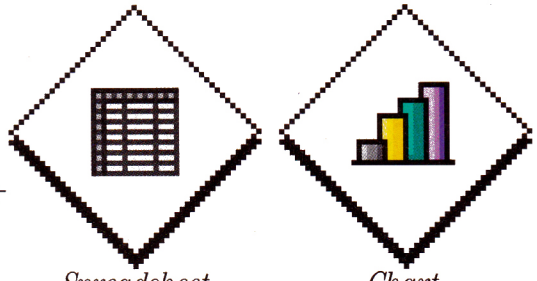
Technical Support: (313) 774-7740 FAX: (313) 774-2698
20200 Nine Mile Rd. • P.O. Box 665 • St. Clair Shores, MI 48080

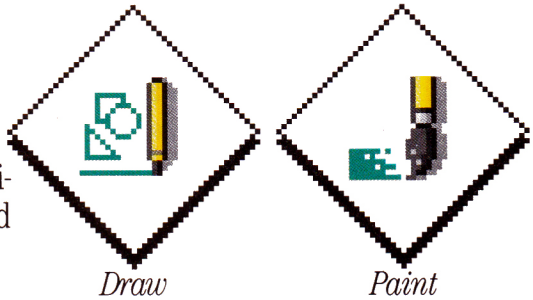
Circle 136 on Reader Service Card.

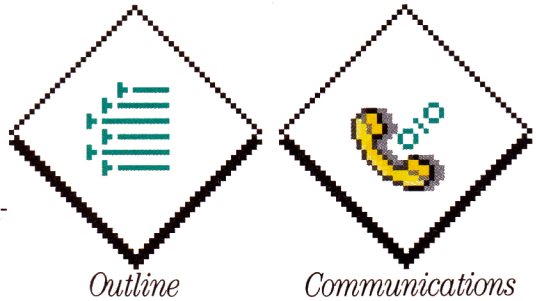
—Imports all AppleWorks word processing, database and spreadsheet documents.—

ONE SIMPLE DECISION, EIGHT GREAT APPLICATIONS.









INTRODUCING GREATWORKS™ FOR THE MACINTOSH.

With just one decision, you can get all the Macintosh software you need to get started. That's because we've combined eight of the most popular applications into one fully-integrated program.

Priced at $299,* GreatWorks offers the ultimate in performance and affordability.

It includes separate modules for word processing, database, spreadsheet, charting, drawing, painting, outlining and communications—all of which are accessed through a consistent interface and supported by an extensive HyperCard Help system.

Each module is a complete application filled with the kinds of advanced features found in stand-alone programs. Those features include sophisticated database forms generation, multiple column word processing documents, more than 60 combination chart types, support for 256 colors, a 100,000-word spelling dictionary and a 660,000-word thesaurus.

All of which means GreatWorks is perfectly suited for a wide variety of jobs.

And since it requires only one megabyte of memory and fully supports System 7, GreatWorks makes the most of any new Macintosh—from a Classic on up.

So see your dealer for your copy of GreatWorks. Or call us at **1-800-228-4122, Ext. 815IN** for more information.

Because, if you're looking for Macintosh software, it doesn't get any simpler than this.



SYMANTEC.™

*Suggested U.S. retail price. © 1991 Symantec Corporation. All rights reserved. GreatWorks is a trademark of Symantec Corporation. All other brand or product names mentioned are trademarks or registered trademarks of their respective holders.

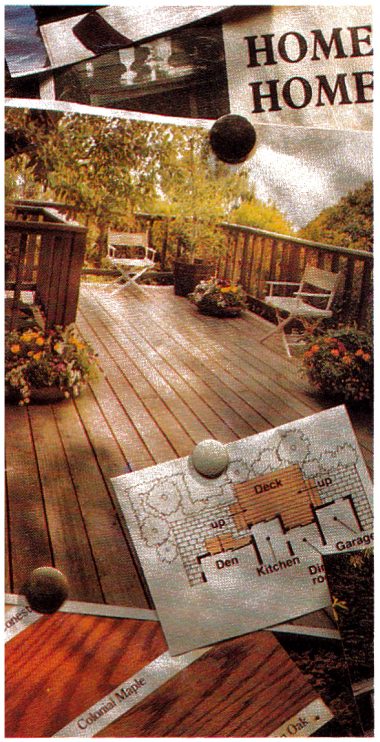
Circle 25 on Reader Service Card.

inCider A+ Apple II/Macintosh

OCTOBER

1991 Vol. 9 No. 10

ARTICLES



p. 32

32 CAD for All Reasons by Cynthia E. Field, Ph.D.
Anything you can dream of in your mind's eye you can conceptualize on the computer screen — that's the beauty of CAD. For armchair architecture, science-class illustrations, and do-it-yourself home projects, computer-aided-design software for Apple IIs and Macs gives you the first tool you'll need to bring your vision to life. It's a blueprint for success: Whether you're creating a woodworking or needlepoint pattern, a landscaping diagram, a home-office floor plan, or a Rube Goldberg-style widget, there's a bounty of CAD programs to help you get started.

40 Breaking Down Barriers by Joe Kohn
For thousands of Americans with physical and developmental disabilities — children and adults alike — Apple's trademark slogan, "the power to be your best," is no empty statement. Thanks to IIs and Macs and an array of adaptive hardware and software products, Apple Computer is a dominant force in the burgeoning movement to grant computer access to people with disabilities and to bring them into the mainstream of American life.



p. 40

COLUMNS

inCider's View * *Dan Muse*
Growing Pains 8

Bridging the Gap * *Gregg Keizer*
Instant Communication 24

AppleWorks in Action * *Ruth Witkin*
Fair Estimates 2 48

Press Room * *Cynthia E. Field*
Cover-Ups 52

Graphics Gallery * *Roger Goode*
Palette Primer 56

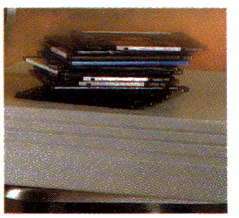
Learning Curve * *David D. Thornburg*
Logo: Multimedia for Everyone 62

DEPARTMENTS

Letters to the Editor 10

What's New
News, New-Product Focus 16

Apple Clinic
Shiftin' Gears:
Changing Speed,
Apple to IBM,
AppleWorks Clinic ... 20



p. 30

Reviews
Q-Drive vs. Resource
Central SCSI Hard Drive,
Dragon Wars GS,
Desert Storm, RoboSport 30

Hints
Automated AppleWorks:
Fast File Creation 64

Editors' Choice
Down on the Farm: SimAnt 72

Downloaded from www.Apple2Online.com

Cover Photograph * Larry Dunn

GROWING PAINS

Apple kept the beer and popcorn flowing for a long while after the spontaneity dried up.

Remember *Peter Pan*? *Never wanna grow up . . . Never wanna grow up . . . Never wanna grow up . . . Nope, not me . . . .* A few years ago the sentiment in that classic song would have fit Apple Computer to a T. Today, however, the song *Taking Care of Business* would be more appropriate for the company that once changed the computer world. Apple is now a multibillion-dollar corporation that bears little resemblance to the garage-based startup that made history and made Steve Jobs and Steve Wozniak millionaires. The irony is that successful small companies turn into larger companies, often losing some of the ingenuity that made them successful. Once viewed as a quick-moving rabbit that darted arounded the bear-like IBM, Apple is now running with IBM. You've probably heard by now that Apple and IBM have agreed to co-develop hardware and software products. To many people, the thought of IBM and Apple joining forces is . . . well, unthinkable. Remember the famous 1984 Super Bowl commercial that implied that Big Blue was really Big Brother? Those were the days.



By DAN MUSE * EDITOR IN CHIEF

Nostalgia aside, the question you have to ask is this: "By hooking up with IBM and implementing other big-business practices, is Apple doing the only thing that makes sense?" While we like the notion of vice presidents wearing tie-dyed t-shirts and jeans, and beer bashes on Friday afternoons (we really like that idea), companies grow and change. Unfortunately, you won't find many $6 billion companies with a true corporate culture. Don't forget that companies such as Digital Equipment Corporation also started in garages.

Apple has tried to fight growing up, much the same way men in their 30s wear trendy sneakers and neon-colored shorts. You can *try* to stay young, but as they say (or maybe I'm saying this for the first time), everyone grows out of being young. Apple kept the beer and popcorn flowing for a long while after the spontaneity dried up. It clung to its counterculture lore as long as it could.

Computer manufacturers, chip makers, and software companies are all taking sides now. And Apple has no choice but to grow up. The IBM alliance is simply good business. We can all lament that this isn't the Apple we used to know. It's frustrating to see Apple treat the II line like an old friend to whom it's simply trying to be polite. To Apple executives, the computer that changed the world just gets in the way.

Successful companies, like people, go through life cycles. Apple has simply matured. It's sad; it's inevitable; that's life. (Hey, you should hear me complain about aches and pains after a weekend softball tournament.) You can try to act as though you're 21, but when the house and car payments are due, you lose the luxury to be wild and crazy. Given the current economic times and industry dynamics, Apple has few options. Its mortgage is due and it has to go to work. Unfortunately, Apple's work isn't fun anymore.

The good news is that Apple's probably well positioned for the future. The obvious question is "what happens after the Mac?" The IBM "partnership" will ensure the company a stake in RISC (reduced instruction set computing) development as well as some longevity for its operating system.

The bad news, however, is that Apple's revolutionary days are probably over. Theoretically, IBM and Apple could develop some new technology together, but let's be real. Where do big companies get new technology? From small companies. Apple is now poised to respond to markets, not create new ones.

But let's not blame Apple for growing up. It fought it for as long as it could. Sadly, though, while Apple will likely be profitable for a long while, it will never be as innovative as it once was. That's a shame. But enough writing for now. My back is beginning to stiffen up a little. ❑

Apple® Service Parts ★ Apple® Chips & ROMs ★ RAM Chips ★ SIMMs

RAM Expansion

Super Expander Boards

//e 64K Extended.....$29
SE.//e w/1024K..LOOK!..$109
SE.//c w/1024K.SAVE!...$119
SE][+ w/1024K.DEALS..$119
16K Language Card II+.....$19

Apple IIgs RAM Cards

1 Meg Card w/1 Meg....$59

GS Juice Plus 4096K

1024K.....$99
2048K.....$139
4096K...SAVE!!!.....$199

RAM Chips & SIMMs

Expand Your....

GS Juice Plus, Chinook 4000
AE GS RAM Plus, CV Tech
41000 (1 Meg x 8).....**$6.00 ea**
Set of 8 1 Meg x 8.....**$46.00**
41256.....ea. $1.50
768K Set for Apple 1 Meg Card
24 Chips.....$32.00

Expand Your....

RAMPak 4 GS
AE GS RAM Ultra
44256(256K x 4).....**$6.00 ea**
Set of 8 256K x 4.....**$46.00**

OctoRAM & Harris Labs

256x8 SIMM.....$12.00
1024x8 SIMM.....$48.00

The Power][Be Your Best!
We Stock old and hard to Find items. If you have a special need, give us a call....

SCSI Hard Disks

Incredible Deals!

20 Meg SCSI.....$229
40 Meg SCSI.....$335
80 Meg SCSI.....$495
SCSI Case & P/S.....$79

Super Savings!

100 Meg SCSI.....$539
130 Meg SCSI.....$595
200 Meg SCSI.....$795
We Have SCSI Cables!! Call!

Disk Drives & Blank Media...

Drives and Parts..

5.25" FH (20 Pin).....$65
5.25" FH (DB-19).....$75
Apple Disk][(Refurb).....$85
5.25" //c Internal.....$89
800K Drive Assy w/exch.$135
Disk][--> DB19 Cable.....$14

ProDOS Users Man.& Disk$15
AppleWorks 1.2 Package..$35
AppleWriter 2.0 Manual....$12
Other manuals..$7, $12 & up...

5.25" & 3.5"

5.25" DSDD Disks.100 for $19
5.25" ...SAVE!..... 500 for $85
3.5" DSDD Disks.....50 for $20
3.5" HD Disks.....10 for $8.50
5.25" Cleaning Disk.....$1.00

Manuals & Other Accessories

Koala Pad.....$29
No Slot Clock.....$27
Joystick.....$9-$29
Paddles.....$7.00

Check out these prices...

We Buy Surplus & Unwanted Items. Call For Details

Alltech Electronics Co., Inc.

602 Garrison St. Oceanside, CA 92054
619/721-7733 • FAX 619/721-2823
Hours: Mon-Fri 10:00AM-7:00PM • SAT 10-5PM PST
3 Southern California Locations

Fax Your Order & Recieve a 2ndDay Shipping Upgrade Free

Keyboards

Apple //e or //c w/exch.....$65
Apple][+ or ///.....,$45
Macintosh 128K/512K.....$65
Numeric Keypad II+/Mac.....$35

Apple][Chips

Apple IIgs Specific Chips

IIgs ROM 01.....344-0077B.....$29
IIgs VGC.....342S0046.....$45

Apple //e & //c Specific Chips

6502 .....$3.00
65C02 (CPU).....$9.00
MMU...342-0010 / 342-0011...$29
IOU...342-0020 / 342-0021...$29
CD/EF ROM....342-0135/0134...$19
AY 3600 PRO.....(kybd encdr).....$29
Video ROM....342-0133/0265.....$19
//e & //c HAL, GLU or TMG.....$9
Keyboard Map.....342-0132.....$19
Apple][+ Parts.....Call

Call For Others Not Listed!

Printers & Heads

ImageWriter I w/exch.....$75.00
ImageWriter II w/exch.....$89.00
C-ITOH/Apple DMP w/exch..$75.00
Refurbed 9 Pin Printer.....$95.00

Our Policy:

Service Parts

CA Residents please add 7% sales tax.
School P.Os' Shipping Billed at cost.
No Handling charges.
Some Products may be used/refurbished. All products come with a 90 day warranty. Inquire at time of purchase for info on specific products.
No returns without an RMA#. Refunds are subject to a 20% restocking charge.
We are not responsible for products purchased in error.
No refunds on S&H charges.
Apple Keyboards, power supplies and other parts subject to exchange only.
Some RAM Chips may be new but not pulled..

Accessories &...

Motherboards

Apple //e or //c w/exch.....$139
W/o Exchange.....$169
Apple][+.....,$99
Macintosh 128K/512K.....$99/$129
Apple /// and Lisa Parts.....Call

Power Supplies

Apple //e or][+ W/Exchange.....$39
W/o Exchange.....$49
Apple //c. Internal P/S.....,$29
Apple //c External P/S.....$39
Apple /// and Lisa Parts.....Call

Cables/Switch Boxes

IIc-->ImageWriter I/II.....$12
II+, IIe-->ImageWriter I/II.....$12
IIgs, IIc+-->ImageWriter I/II.....$12
Apple MiniDin 8 (Both Ends).....$12
A/B Switch Box...starting @$29.00
Disk II 20 Pin to DB19 Cable.$14
Call for other cable configurations

Monitors

Apple Monitor IIc.....$79
Apple Monitor ///.....$65
Amdek Color-I Composite 14"...$105
Refurb Comp Green/Amber.....$35.

Peripheral Cards

80 Col Card II+.....$45.00
5.25" Disk Cntrl..(20Pin/DB19)..$39.
3.5" UniDisk Cntl (Smartport)...$58
Graphic Parallel Printer Card...$45
Super Serial Card.....$52
Z80 CPM or Hayes Modem300....$29
System Saver //e.....$35
Mountain CPS II+.....$45

Apple Cases

Apple //e or //c.....$45
Apple][+.....$19
Macintosh (128/512).....$45

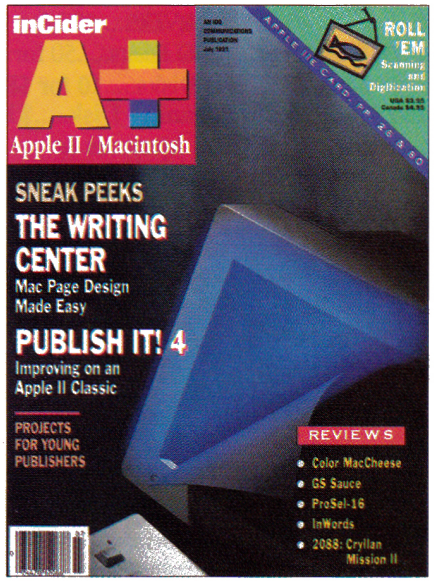
School Purchase Orders Accepted!

Circle 103 on Reader Service Card.

Apple II Forever! • The Power][Be Your Best • This advertisement was produced using AppleWorks 3.0 & PageMaker 4.0 Together, the best of both worlds!



LETTERS



EXPOSTULATION AND REPLY

THANK YOUR FOR THE POSITIVE appraisal of The Geometer's Sketchpad in July's Stattus Report ("The Old Geometer," p. 22). I'm pleased that Mr. Statt thinks Sketchpad is "the best software an instructor of geometry with a Mac can buy." However, I hesitate to recommend Mr. Statt's approach to teaching. The "old geometry" of which he is fond has been identified as a major dropping-off point for students' interest and competence in mathematics.

Perhaps as a result of being out of the classroom for a decade, Mr. Statt seems unaware of the national Council for Teachers of Mathematics' recently published *Standards for School Mathematics* (1989), which addresses this disturbing trend by directing attention away from formal proof and toward mathematical visualization, verbalization, and exploration. This isn't to say there's no room for "proofs." Sketchpad's documentation clearly states, "We don't, however, advocate that you abandon all other teaching methods in favor of using the computer. It's our belief that students learn best when they're exposed to a variety of different learning experiences." Students can put proofs to much better use if they are encouraged to understand what they're trying to prove and why it might be beneficial to prove it. It's in this context of geometric inquiry and experimentation, rather than the formal proof's memorization and demonstration, that I hope educators find The Geometer's Sketchpad valuable.

Nicholas Jackiw
Designer, The Geometer's Sketchpad
Key Curriculum Press
2512 Martin Luther King Jr. Way
Berkeley, CA 94702

NEVER HAVE SO FEW . . .

I ENJOYED JOE KOHN'S ARTICLE about user groups in the July issue ("Users, Unite," p. 50), but have a couple of comments. Mr. Kohn mentioned the user-group representative programs that some third-party hardware and software companies have started, and pointed out that "Beagle Buddies" and "Seven Hills Partners" can update software for user-group members.

That's true, but "Buddies" and "Partners" do much more: They provide technical support, demonstrate products, offer information about existing and upcoming products, and may have the opportunity to beta-test products.

Mr. Kohn points out that "Buddies" and "Partners" are volunteers, whose only compensation is free copies of the company's products. Being a user-group representative can be fun and satisfying, but answering questions, updating programs, and learning to use new products takes a lot of time and energy. No one should agree to be a "Buddy" or a "Partner" simply to get free software; instead people sign on because they believe in the company and its products and have a strong desire to help the members of their user groups.

Also, readers may not have realized from the article that you don't need to belong to a local user group to obtain the benefits of a representative. CompuServe's MAUG (Micronetworked Apple Users Group) has a "Buddy" and a "Partner" assigned to it. While we can't demonstrate products, we do provide MAUG's members with low-cost updates, answers to questions about new products, technical support, and occasionally uploaded demonstration versions of software.

Kathryn Beth Willig
Seven Hills Partner for MAUG
37 College Drive
Jersey City, NJ 07305



CROSSTALK

Some would argue that if clothes make the man, then system software makes the machine. So how does the wardrobe fit? What version of system software are you using? Is System 7.0 for the Macintosh the king's robe or just the emperor's new clothes? What about the new Apple IIGS Finder?

The world may be going to the dogs, but now you can say something about it. Call our CrossTalk line, (603) 924-0301, and sound off on our topic of the month. Make sure you tell us who you are and where you're from, and we'll publish the best responses right here.

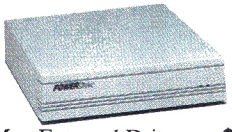
YOU ASKED FOR IT.

- YOU WANTED FAS-TRACK'S TOLL-FREE TECH SUPPORT.
- YOU WANTED SCHOOL PO's WELCOME.
- YOU WANTED 30-DAY UNCONDITIONAL MONEY-BACK GUARANTEE.
- YOU WANTED FAS-TRACK'S PRICE MATCH. Call for details.
- YOU WANTED FAS-TRACK'S GIANT CATALOG. FREE.

YOU GOT IT!

FAS-TRACK DELIVERS!

Fas-Track PowerDrive—featuring Quantum SCSI Hard Drives



52 Meg External Drive	**$349.95**
105 Meg External Drive	**$479.95**
RamFAST/SCSI w/256K	$179.95
Salvation Supreme (IIgs)	$99.95
ProSel 8 (IIe)	$32.95
ProSel 16 w/Manual (IIgs)	$69.95

- Compatible with Apple IIgs, Apple IIe, and Mac. (Apple IIgs and IIe require a SCSI interface)
- Fast 19ms access time
- External case with power supply
- 2 SCSI Ports
- 30 day money back guarantee and 1 year warranty
- Preformatted for Apple IIgs (GS/OS), Apple IIe (ProDos 8), or Mac
- Includes all cables and manuals

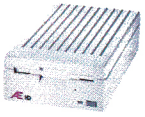
Applied Enginnering

TransWarp GS w/8k cache	$219.95
TransWarp GS w/32k cache	$294.95
TransWarp GS upgrade	$86.95
GS Ram III w/1 Meg	$159.95
GS Ram III w/2 Meg	$214.95
GS Ram Plus w/1 Meg	$199.95
GS Ram Plus w/2 Meg	$249.95
TransWarp IIe (4 mhz)	$94.95
RamWorks III w/256K	$139.95

Memory Chip Upgrades

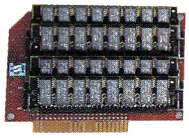
256K x1 Drams (8 - 120ns)	$19.95
1 Meg x 1 Drams (8 - 100ns)	$54.95
1 Meg x 8 SIMMs (80 ns)	$54.95

AE 3.5" Daisy-Chain Drive



800K **$189**
1.6 Meg **$245**
IIe UDC Card **$40**

New! IIgs Super RAM



Add up to 4 meg to your Apple IIgs. 100% compatible. 5 year warranty.

IIgs Super RAM w/1 Meg	$99.95
IIgs Super RAM w/2 Meg	$139.95
IIgs Super RAM w/4 Meg	$219.95

Zoom 2400B Modem Pack



Package includes Zoom MX 2400 baud external modem, Beagle Brothers Point-to-Point Communications software, Compuserve and Genie starter Kits and more. Compatible with Apple IIe, IIc, IIgs, and Laser 128 series **$134.95**

Zip IIgs

GSX1500-7mhz, 8k cache	$149.95
GSX1600-8mhz, 16k cache	$199.95
GSX1800-9mhz, 16k cache	$229.95

Productivity Software

AppleWorks 3.0	$169.95
AppleWorks GS 1.1	$199.95
HyperStudio 2.1 (IIgs)	$83.95
ProTERM	$79.95
Copy II Plus 9.1	$24.95
Prosel 16 w/Manual (IIgs)	$69.95
Cross-Works	$69.95
Vitesse Salvation Series(IIgs)	$99.95

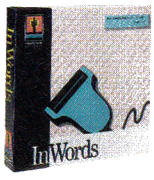
Vitesse Quickie Scanner



Quickie 400DPI Handscanner for Apple IIe & IIgs includes new 16 gray shade software **$194.95**

Quickie & InWords Package **$269**

InWords OCR Software

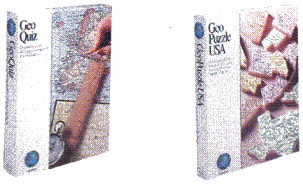


InWords OCR software allows you to scan text and use it with AppleWorks and other applications. **$79.95**

Edu-Tainment Software

Childrens' Writing & Publishing Center	$34.95
Oregon Trail	$24.95
Word, Number Munchers	ea $24.95
Think Quick	$29.95
Mavis Beacon Typing (IIe)	$25.95
Mavis Beacon Typing (IIgs)	$31.95
Computer SAT or ACT	$29.95
Chessmster 2100(IIe or IIgs)	$31.95
Maniac Mansion	$14.95
Tetris (IIe and IIgs)	$24.95
Task Force (IIgs)	$24.95

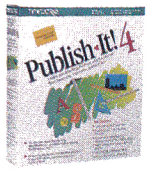
GeoQuiz and GeoPuzzle



Two geography titles for Apple II.

GeoQuiz (IIgs only)	$29.95
GeoPuzzle (IIe or IIgs)	ea $24.95

Publish It!4



New and improved version of the number one selling Apple IIe and IIgs DTP Program **$77.95**

4 In One Art Portfoilo $79.95

Print Shop Companion IIgs



Apple IIgs **$29.95**

Print Shop IIgs **$35.95**

Other Broderbund Titles

The New Print Shop	$29.95
Banner Mania	$21.95
Where in Time or USA	$27.95
Where in the World	$25.95

Beagle Brothers Software

Platinum Paint (IIgs)	$59.95
AW 3.0 Companion Plus	$29.95
T.O. TextTools, Thesaurus	$30.95
T.O. Superfonts	$42.50
T.O. Sidespread	$30.95
T.O. SuperForms, Outliner	$42.50

Other Hardware

ComputerEyes IIgs	$194.95
Lightning Scan IIgs	$199.95
IIe 80 Column 64K Card	$19.95

Accessories



IW Black Ribbon
1-5 **$2.95** 6+ **$2.25**
IW 4-Color
1-5 **$5.95** 6+ **$4.95**

10 DS/DD 3.5" Disks	$5.50
10 High Density 3.5" Disks	$10.50
25 DS/DD 5.25" Disks	$8.25

FAS-TRACK COMPUTER PRODUCTS

CALL TOLL-FREE 1-800-421-4698

1-614-847-4050 (central Ohio)
1-614-847-4180 FAX

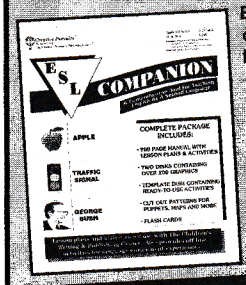
MON—FRI 9 AM TO 8 PM/SAT 10 AM TO 5 PM (EST)

We accept MasterCard, VISA, and Discover Card—no extra charge. School purchase orders welcome. Continental U.S., F.P.O., and A.P.O., add 4% (minimum $4.00 for each shipment). AK,HI, PR, VI, and Canada, add 5% (minimum $10). International orders, except Canada, will be shipped priority mail insured and charges will be added to your order. No C.O.D. Ohio residents add 5.75% Sales Tax. Please, no returns without prior authorization. All products have a 30 day unconditional money back guarantee. Shipping charges are not refundable. Prices and availability are subject to change without notice.

Circle 85 on Reader Service Card.

7030C HUNTLEY ROAD • COLUMBUS, OHIO 43229

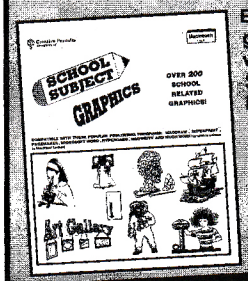
Are you in hot pursuit of new products?



ESL COMPANION is a comprehensive tool for teaching English as a second language. Use off-line or with The Children's Writing and Publishing Center™ to teach English acquisition skills. Lessons include general studies and everyday life situations.

ESL Companion

$124.95 Apple $129.95 IBM & Compat.

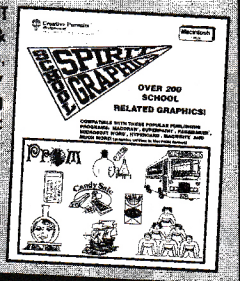


Expand your MAC's graphic capabilities with SCHOOL SUBJECT GRAPHICS in MacPaint & EPS formats. Includes: Animals, American History, Earth & Sky, Human Body, Inventions, Mathematics, Music and Arts.

School Subject Graphics

$39.95 (MacPaint) Macintosh $84.95 (EPS) Macintosh

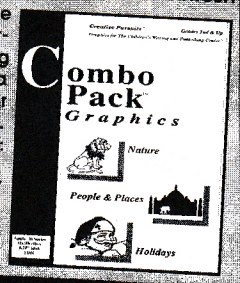
SCHOOL SPIRIT GRAPHICS, in EPS & MacPaint formats, for use with many MAC publishing programs. Includes: Administration, Awards, Celebrations, Classroom, Field Trips, Kids, School Supplies and Sports.



School Spirit Graphics

$39.95 (MacPaint) Macintosh $84.95 (EPS) Macintosh

Extend & enhance The Children's Writing & Publishing Center™ with a collection of over 350 color graphics. Includes 3 disks: NATURE GRAPHICS, HOLIDAY GRAPHICS and PEOPLE & PLACES GRAPHICS.



Combo Pack Graphics

$74.95 Apple $84.95 IBM & Compat.



Creative Pursuits™
12151 La Casa Lane
Los Angeles, CA 90049
213-472-1179

Circle 220 on Reader Service Card.

LETTERS

EMULATION EXACERBATION

YOUR MAGAZINE IS ONE OF THE last available forums for disgruntled Apple II users to speak out.

I'd like to add my voice to the chorus demanding IIGS emulation for the Macintosh LC. I would have been happy to pay more for a computer that let me expand while maintaining the integrity of my large investment in Apple II and IIGS hardware and software.

With the IIGS apparently headed for a dead end, I'll need new software, new manuals and a new machine — does Apple really think it'll be a Mac?

This is only one letter and I'm only one customer, but I'm not alone in my response to Apple's lack of concern for those of us who purchased IIGS systems. If Apple doesn't move quickly to correct this problem, I'm moving to Big Blue.

Clayton Burnham
4716 Spring Creek Road
Arlington, TX 76017

AIDSTACK CORRECTION

WHAT A WONDERFUL SURPRISE to read Neil Shapiro's review of The AIDS Stack. (See "Hyperstacks Done Dirt Cheap," May 1991, p. 40.)

The AIDS Stack has been revised several times since it was originally uploaded on bulletin boards in 1987. In fact, the current edition, January 1991, is being shown as part of "Group Material: AIDS Timeline" at the Whitney Museum's 1991 Biennial of American Art. This exhibit features a Macintosh loaded with The AIDS Stack and three more of Michael Tidmus' HyperCard stacks — Discourse, NEXT, and Harsh Words for Jesse.

Unfortunately, you gave an incorrect address. Anyone interested in obtaining a copy can request one directly from Michael Tidmus at 2117 Avon Street, Los Angeles, CA 90026.

The AIDS Stack is updated about four times a year. Michael asks for a $25 donation for a single copy or a $75 donation for a four-issue subscription. PWAs (*persons with AIDS*), PWARCs (*persons with AIDS-related conditions*), or anyone who can't afford the donation may request a free copy.

Copies of the other stacks are also available for a donation of $5 each, which covers duplication costs.

John Olson
Art Savant
2117 Avon Street
Los Angeles, CA 90026

Sorry about the address. We viewed Michael Tidmus' Discourse and Harsh Words for Jesse recently. Both stacks are intriguing and thought-provoking — well worth seeing. — eds.

HIGH (DENSITY) ANXIETY

IN YOUR REVIEW OF THE APPLIED Engineering HD drive (May 1991, p. 28) you failed to mention a few things. First, it isn't possible to use the HD as a primary boot drive. (The manual even fails to mention this.) Second, I've found that once I've inserted a high-density disk, the drive often won't recognize an 800K disk until I turn off the computer, then turn it on again. Finally, unless you remove some items from your System Disk (if you're booting from a floppy), there's no space for the driver you need to run the AE HD drive.

Michael Besner
Minneapolis, MN

It's true that you can't use the AE HD drive as a boot drive with a high-density disk, but you can boot from an 800K disk. Applied Engineering is aware of a conflict between the drive and AppleWorks GS and ShrinkIt GS: If you try to switch disks when you're in the Open File *dialog box and looking at the directory of a disk in the AE HD drive, the drive will refuse to recognize any disk you insert. Your disk won't be damaged, though, and AE is working on a fix. As for switching between high- and low-density disks, congratulations — you seem to have a unique problem. Anyone out there have a suggestion? — eds.*

inCider/A+ WELCOMES READERS' COMMENTS. WE RESERVE THE RIGHT TO EDIT LETTERS FOR CLARITY, STYLE, AND SPACE. PLEASE ADDRESS YOUR CORRESPONDENCE TO LETTERS, *inCider/A+*, 80 ELM STREET, PETERBOROUGH, NH 03458.

CORRECTION

The phone number for Charlie's Apple Seeds as listed in our July issue, p. 68, contains an error. The correct number is (619) 566-1297.

EDUCATIONAL RESOURCES™

USA/CANADA TOLL FREE
800-624-2926

IN ILLINOIS
708-888-8300

YOUR SINGLE SOURCE SUPPLIER FOR COMPUTER SOFTWARE ■ DISKETTES ■ ACCESSORIES

A+ in SAVINGS!

Save up to 60% Everyday!

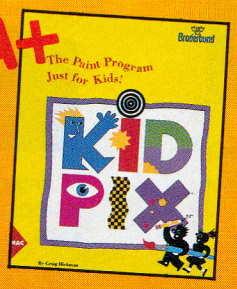
Call Now for Your FREE Fall & Mac Catalogs!



WEATHER WIZARDS
$59.99
APL/IIGS/IBM
LAB PACK $95.99



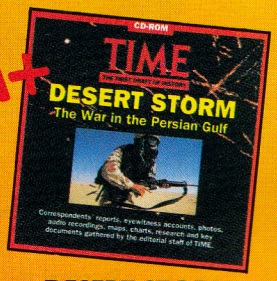
ESL COMPANION
$79.99
APL/IBM



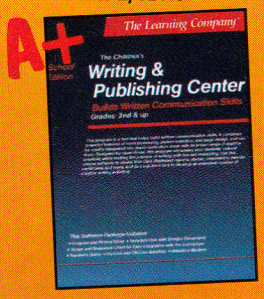
KID PIX
$29.99
MAC
School Version $44.95



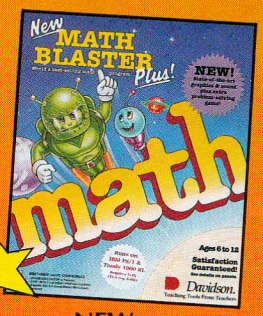
COLOR MACCHEESE
$56.99
MAC



DESERT STORM
$34.99
MAC CD-ROM



CHILDREN'S WRITING & PUBLISHING CENTER
School Version $64.99 APL/IIGS
Home Version $35.99
Lab Pack $135.99
THE WRITING CENTER
Now Enhanced for the MAC
$86.99



NEW MATH BLASTER PLUS
$29.99
APL/IIGS/IBM
School Version $48.99
Lab Pack $144.99
MAC $41.99

DISKS/PAPER

Multiples of 50

Disks - 5.25" DS/DD ..	$ .35
Disks - 3.5" DS/DD	.69

10 Pack Assortment

Color Disks - 5.25"	6.95
Color Disks - 3.5"	14.50

250 Sheet Assortment

Color Paper	10.95

CD-ROM/LASERDISCS

Vietnam Remembered	CD	79.95
CD Fun House	CD	42.95
Scary Poems for Rotten Kids	CD	69.95
Cosmic Osmo	CD	59.95
Grolier Electronic Encyclopedia ..	CD	274.95
Bio Sci II	LD	492.95
Aids	LD	493.95
Pioneer LaserDisc LD-V2200 Player		699.95
NEC Intersect CDR-36 CD-ROM Player		475.00

COMBO PACK GRAPHICS

350 Color Graphics!

To Enhance the Children's Writing & Publishing Center
Includes All Three Graphics Disks:
NATURE
HOLIDAY
PEOPLE & PLACES
$49.99 APL/IIGS
School Version $59.99



LASER PC4 PORTABLE COMPUTER

Great for Home & Classroom!

Download files to your IBM/MAC.
Includes MacLink™ or PC Tools™ Desktop.

- Spell checker
- Word processor
- Spreadsheet
- Phone directory
- Auto phone dialer
- Appointment book
- Expense module
- Alarm clock
- Less than 2 pounds



$239.99 MAC
$209.99 IBM

LOWEST RIBBON PRICES

ImageWriter I & II*	$ 2.50
ImageWriter II 4-color	4.95
ImageWriter II 4-color Heat Trans	14.95
Panasonic KX-P 1090, 1091, 1092*	3.25
Epson MX/FX/RX 70, 80*	2.50
Epson LX 80/90*	2.50
Epson MX 100	4.00
IBM ProPrinter	4.75
Okidata 182/192/193	2.99

* For quantities less than 6 or for colors - add $1.00 each

EXTRAS

ComputerEyes, Color IIGS	$ 194.95
PC Viewer 480S	895.95
PC Viewer (New Color)	1895.95
Vulcan 40 meg Hard Drive APL/IIGS ..	649.95
Quickie Hand Scanner APL/IIGS	194.95
InWords (for use w/ Quickie)	79.95
IIEasy RAM 64K Memory Upgrade ...	18.95
Laser 128 Color System	499.95
Laser 128 Monochrome Monitor	349.95

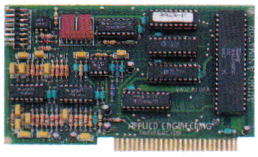
TERMS *Prices effective thru October 31, 1991*

- Checks & School P.O.'s welcome
- Free shipping over $300 in U.S.
- Under $300 add 5% shipping w/ $4.00 min.
- $25 min. on charge cards
- Canada under $500 add 10% w/ $5 min. over $500, add 5%. Also add 7% GST

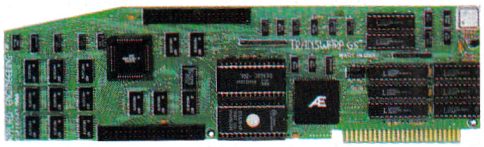
DISCOVER MasterCard VISA

Mail School PO's to:
EDUCATIONAL RESOURCES
1550 Executive Drive
Elgin, Illinois 60123

Circle 220 on Reader Service Card.



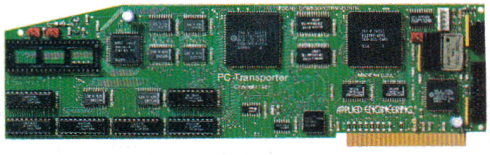
Audio Animator unleashes the sound potential your IIGS was born with. Complete MIDI interface, software and external mixer. $219



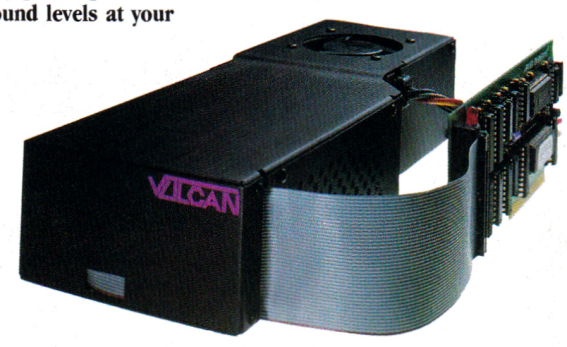
Compute at Warp speed with TransWarp GS. More than doubles processing speed and it's upgradable. $299 w/8K Cache and $399 w/32K Cache



External mixer (included with Audio Animator) places precise control over sound levels at your fingertips.

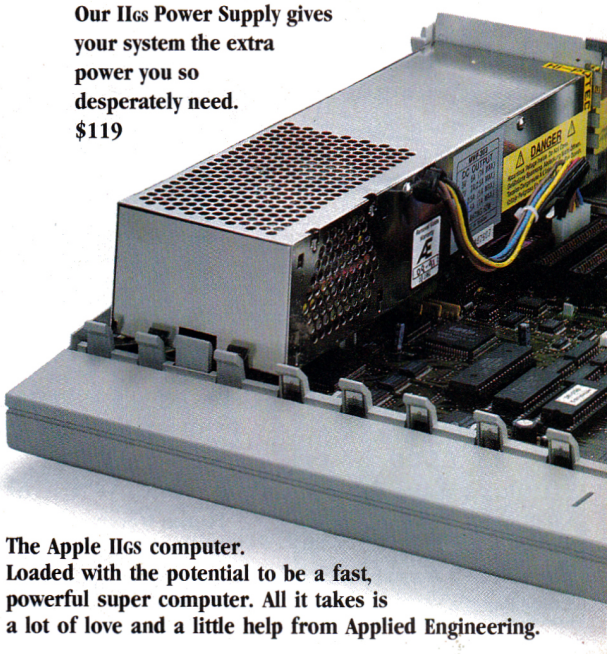


PC Transporter lets your IIGS run IBM's MS-DOS. Shop both sides of the software aisles. $349



Vulcan internal hard disk replaces the Apple power supply with 70 watts of pure power and up to 200 MEGs of storage capacity. From $699.

Our IIGS Power Supply gives your system the extra power you so desperately need. $119



The Apple IIGS computer. Loaded with the potential to be a fast, powerful super computer. All it takes is a lot of love and a little help from Applied Engineering.

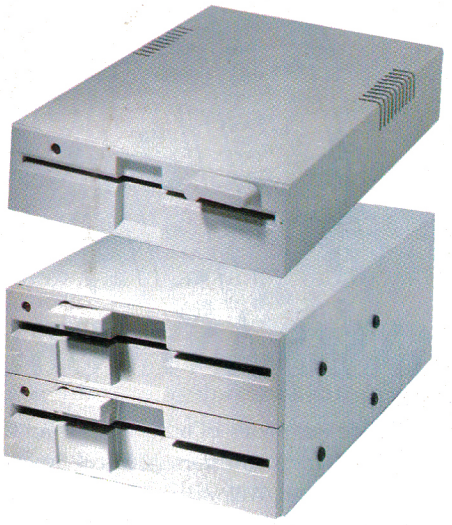
Super System IIGS

For ten years, Applied Engineering has set the Apple II industry standard for quality and reliability. We do it with top-notch tech support, innovative new products and a commitment to design and build the best products possible. To receive your free 32-page Applied Engineering product catalog, see your dealer or call (214) 241-6060 today, 9 am to 6 pm, Monday through Friday. To place an order, send check or money order to Applied Engineering. MasterCard, VISA, and C.O.D. welcome. Texas residents add applicable sales tax.

Made IN THE USA

P.O. Box 5100 • Carrollton, TX 75011 • (214) 241-6060

© Copyright 1991. AE Research, Inc. All rights reserved. *Prices subject to change without notice*

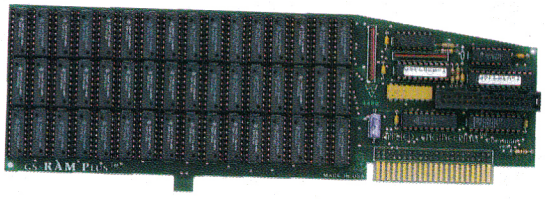


Applied Engineering's 5.25 disk drive (top) features a new design for virtually flawless performance. $169

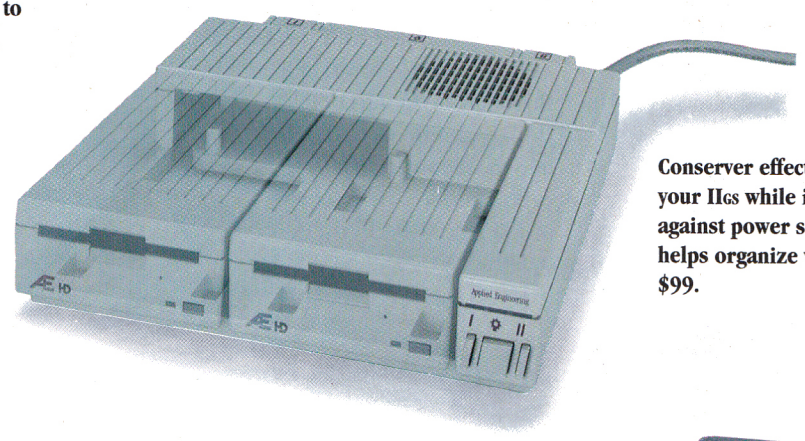
MS-DOS compatible 5.25 Drive System (bottom) allows MS-DOS programs on 360K disks to boot from PC Transporter. From $259

The AE 3.5" Disk Drives are completely Apple compatible. The AEHD can store 1.44 Mb *per disk!* 800K - $279
1.44Mb - $339

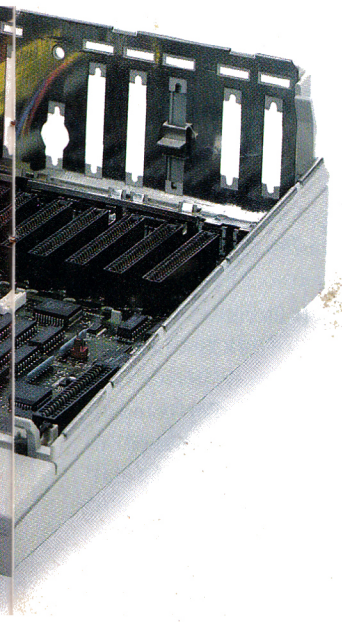




The GS-RAM Plus memory card grows from 1 to 6 Mb, with full compatability. From $189.

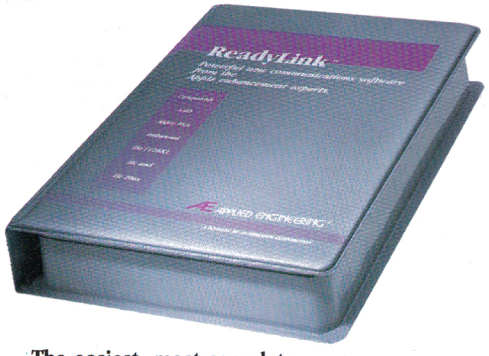


Conserver effectively cools your IIcs while it protects against power surges and helps organize workspace. $99.





Our modems, both internal and external, are upgradable, Hayes compatible and now have a Send-Fax option. Complete with software and free online time. From $249.



The easiest, most complete, most popular communications software available. It's ReadyLink. $99.

Applied Engineering®
The Apple enhancement experts.

A Division of AE Research Corporation

HYPERSTUDIO'S NEW DEVELOPMENTS

The talk of the developers' conference that preceded the Apple II Central Expo was **HyperStudio 3.0** from Roger Wagner Publishing. After Rob Barnes, Apple II evangelist, said that "the reality of the Apple II market is education," the new HyperStudio scripting language really had folks talking: It should make it possible for any teacher to become a software developer. Developers who create HyperStudio stacks will be able to market them in the new ***Neat HyperStuff*** catalog, which is available at no cost from RWP.

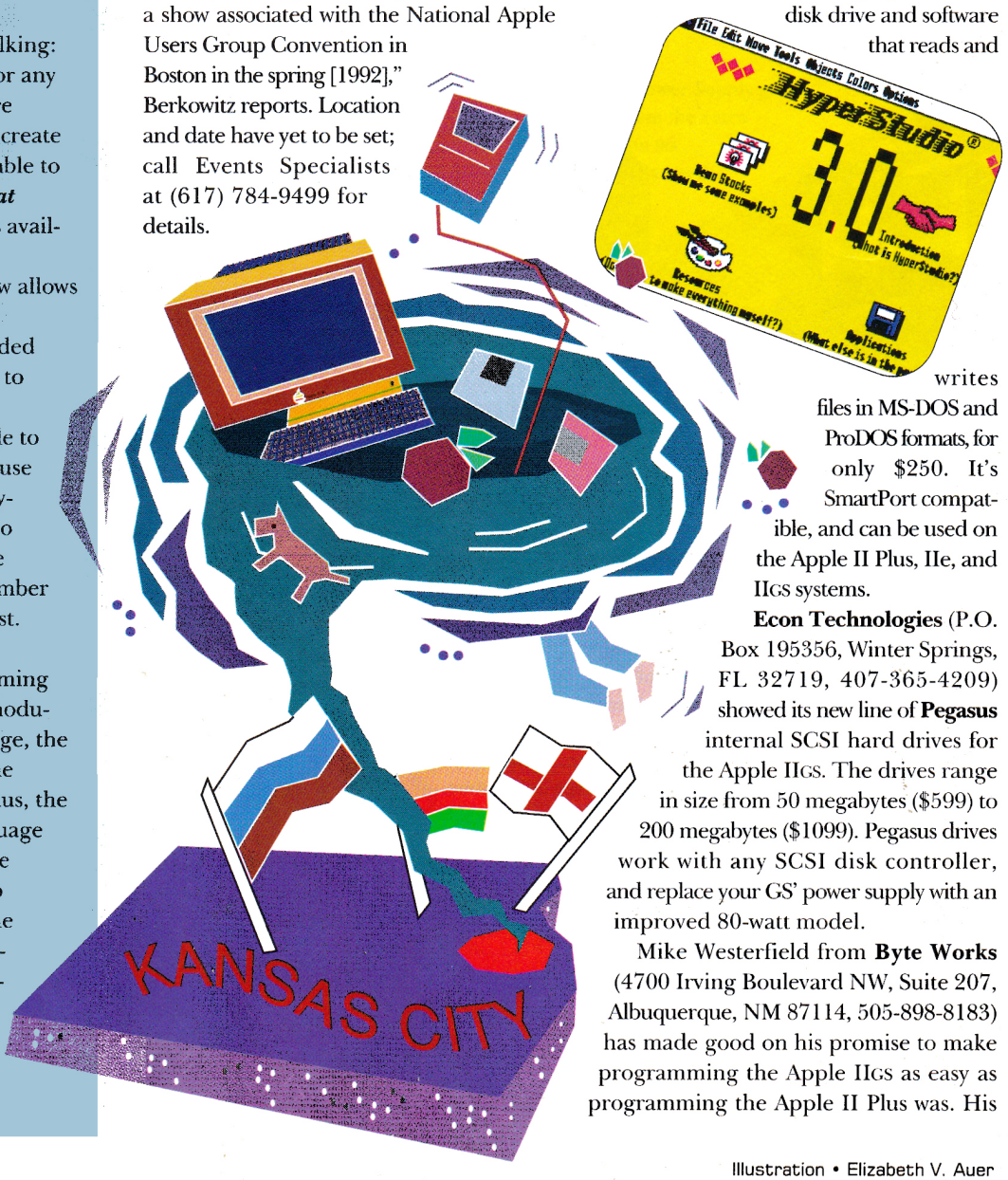
The new HyperStudio now allows editing of buttons, and has renamed its XCMDs (extended commands) "button tricks," to make programming in HyperStudio more accessible to all. It's also now possible to use 320-by-200 as well as 640-by-200 graphics in HyperStudio stacks — in fact, in the same stack. This increases the number of colors available to an artist.

But the key to the new HyperStudio is its programming language. Combining the modularity of a structured language, the familiarity of BASIC, and the simplicity of pull-down menus, the HyperStudio scripting language looks like a sure winner. The programmer never needs to write a single line of code; he or she chooses what the program does next just by looking at a menu of options. What could be simpler?

— **P.S.**

WE'RE NOT IN KANSAS ANYMORE

More than 2000 Apple II enthusiasts from all over North America and beyond crowded the hall at the Apple II Central Expo after KansasFest. (See the accompanying sidebar, "System 6.0: New Face in the Crowd.") Bob Berkowitz of Events Specialists, director of the show, said he and the exhibitors were so pleased with the turnout they're ready to do it again. "We'll have a show associated with the National Apple Users Group Convention in Boston in the spring [1992]," Berkowitz reports. Location and date have yet to be set; call Events Specialists at (617) 784-9499 for details.

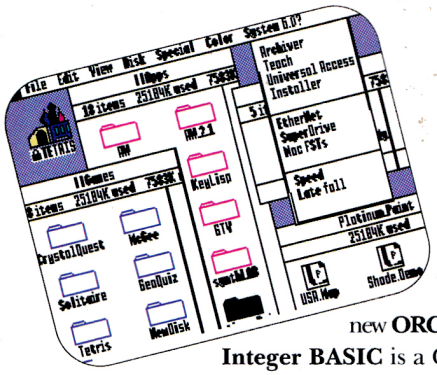


There was plenty of other news from the show in Kansas. For starters, **Micol Systems** (9 Lynch Road, Willowdale, Ontario, Canada M2J 2V6, 416-495-6864) is using its connections in the Soviet Union (see "Better Red Than Dead?" May 1990, p. 42) to build a low-cost IBM PC-type floppy-disk controller there. The **Liberty** controller will come bundled with a 1.6-megabyte 3.5-inch disk drive and software that reads and writes files in MS-DOS and ProDOS formats, for only $250. It's SmartPort compatible, and can be used on the Apple II Plus, IIe, and IIGS systems.

Econ Technologies (P.O. Box 195356, Winter Springs, FL 32719, 407-365-4209) showed its new line of **Pegasus** internal SCSI hard drives for the Apple IIGS. The drives range in size from 50 megabytes ($599) to 200 megabytes ($1099). Pegasus drives work with any SCSI disk controller, and replace your GS' power supply with an improved 80-watt model.

Mike Westerfield from **Byte Works** (4700 Irving Boulevard NW, Suite 207, Albuquerque, NM 87114, 505-898-8183) has made good on his promise to make programming the Apple IIGS as easy as programming the Apple II Plus was. His

Illustration • Elizabeth V. Auer



new **ORCA/Integer BASIC** is a GS version of the language that came with the original Apple II in 1976. It's fast, it's fun, and it's a neat introduction to compilers and basic programming, too. It's worth more than its price of $50 just for the public-domain programs included on the free "goodies" disk (offer good until September 30).

SSSI (4621 North Landing Drive NE, Marietta, GA 30066, 404-928-4388) plans a fall release of its completely new Apple IIGS desk-accessories collection, **DeskPak**, which will have so many new features that many users will find all the applications they need right under the *Apple* menu. The package includes **DeskWrite**, **DataDesk**, and **MultiCalc** — a word processor, a database manager, and a calculator — in addition to neat extras such as a screen saver and a macro recorder, and other calendars, tools, and applications, all for $79.95.

Chinook Technology (1811 Lefthand Circle, Suite B, Longmont, CO 80501, 303-678-5544) made owners of "classic" Apple IIs — such as the Apple IIc and the IIc Plus — happier with its **CT20c** ($549), **CT40c** ($649), and **CT100c** ($799) hard-disk drives. They're fully SmartPort compatible: They work with any Apple II that can use a UniDisk with a UniDisk controller card, such as the Apple IIe, as well as with any Apple II that has a SmartPort, such as the IIGS and the IIc Plus.

Procyon demonstrated its "gnifty gnew **GNO**" multitasking environment for the IIGS. It's designed to be a UNIX-like shell for that machine. **Big Red Computer Club** was showing its newly acquired line of **Electronic Arts** software for the Apple II. **Zip Technology** was talking about a hard-disk drive and controller card. **360 Systems** showed a number of games, including **IIGS Dark Castle**.

All in all, a pretty good haul — Apple II fans may not have gotten their wish for a brand-new machine this year, but there's no doubt the older models are still kicking up their heels. **— P.S.**

SYSTEM 6.0: NEW FACE IN THE CROWD

Apple developers had hoped that the rumors of a new Apple IIGS Plus for the 1991 holidays would come true at Kansas-Fest in July, but Apple kept its word and didn't release any new computers at the A-2 Central Apple Developers Conference. "What Robert Puette [vice-president of Apple USA] said last year is still true," according to Rob Barnes, Apple II software evangelist, in a speech to the assembled developers. "Apple has no plans to introduce new Apple II CPUs." But that didn't stop Apple from announcing some slick new system software and a couple of peripherals. **System Disk 6.0** for the Apple IIGS appears to have two design goals — to fix the annoying quirks of System 5, and to make Apple IIGSes and Macs work better together. Apple IIGS system software works more like Macintosh system software than ever. And the new **EtherNet** and **SuperDrive** cards for the IIGS and enhanced IIes/IIcs will make it easier for Apple IIs and Macs to share disk drives and to work together in networks.

> "The Finder is the face that system software shows to the world — and System 6.0's Finder is a beauty."

The Finder is the face that system software shows to the world, and Finder 6.0 is a beauty. Apple's Andy Nicholas, showed his new Finder to unanimous acclaim. It's notably faster and easier to use if you're accustomed to the Macintosh Finder. There's now a Windows menu that lets you select hidden windows, for one thing.

You can also "option click" and close all windows on the desktop. Copying files by dragging is more intelligent; you can also copy folders onto the desktop. Large files are measured in megabytes now, not kilobytes. The new Finder's riches will certainly need exploring.

The new system, according to Apple's Greg Branch, will also have many less-obvious "internal enhancements" that will "significantly speed up all character input and output" — in other words, just about every aspect of computing. Another important new feature of System 6 is its support for multiple file systems — specifically the older Apple DOS 3.3 and Apple Pascal operating systems, and the Mac file system. Apple also demonstrated a program that could read MacWrite files directly. Apple will include printer drivers for the StyleWriter, Apple's compact low-cost ink-jet printer, as well as drivers for the Apple Flatbed Scanner and the Apple Tape Drive.

Ron Lichty showed several applications that will be part of System 6: Archiver, a file and volume backup and retrieval utility; Teach, a tiny word processor you can use to read "Read Me First" files; Universal Access, a collection of aids for users with disabilities (see "Breaking Down Barriers" in this issue, p. 40); and a vastly improved Installer that makes putting new software onto a hard drive a one-button operation. These applications can be licensed for use by developers.

Probably the biggest difference between Apple IIGS System 6 and Macintosh System 7 is that System 6 won't require the average user to add more memory to his or her IIGS. It will come on five disks, but only two will contain actual system software; the others contain the Installer, a collection of fonts, and boot routines for 800K drives. Apple engineers are bragging that the new system software is only 20K larger than the old — but it certainly packs a lot more power. **— P.S.**

NEW-PRODUCT FOCUS

▲ MAC ◆ APPLE II ■ APPLE IIGS

"Apple II" indicates an 8-bit product compatible with IIes, IIcs, IIc Pluses, and IIGses unless noted otherwise.

NEW HARDWARE

◆

Shan's Digicorder

Every Apple computer can sport the musical ability of the IIGS with **Shan's Digicorder**, a hardware/software combination that delivers polyphonic music and natural human speech in any language on any Apple II. (Two 5.25-inch disk drives or a 3.5-inch/5.25-inch disk-drive combination is required.)

You can digitize sounds, edit them by sight, and create all kinds of special effects, including custom sounds for alerts, startup, and error messages, just like those on the IIGS and the Mac, thanks to the Digicorder's graphical interface.

The package provides a number of special-effects and demonstration programs, as well, for only $49.95, which includes shipping from India. Zuhyde Intelligent Computer Products, the Digicorder's manufacturer, is also seeking distributors and dealers in North America and Europe.

For more information, contact Zuhyde Intelligent Computer Products, Vatanappally, Kerala, Pin: 680614, India, telephone (4887) 376 or (4887) 782, or circle number 350 on the Reader Service card.

▲ ◆ ■

Unicorn Overlay Express

Now you can turn your printer into an overlay-producing machine. The **Unicorn Overlay Express** ($140) offers layouts of two, eight, or 32 squares or lets you design your own in up to seven colors. You can even add pictures or icons from the libraries included: KeyPics, containing keyboard symbols, and Core Picture Vocabulary, a collection of communications icons.

The Overlay Express works with ImageWriter (I or II), LaserWriter, and Epson FX printers. You can print overlays for both the Expanded Keyboard Model II or the smaller Keyboard Model 510 alternative input devices from Unicorn. More picture libraries will be available soon, including **Mayer-Johnson Picture Communication Symbols** and a **Holidays** collection, expected this fall or winter. For more information, contact Unicorn Engineering, 5221 Central Avenue, Suite 205, Richmond, CA 94804, (800) 899-6687 or (415) 528-0670, or circle number 351 on the Reader Service card.

NEW SOFTWARE

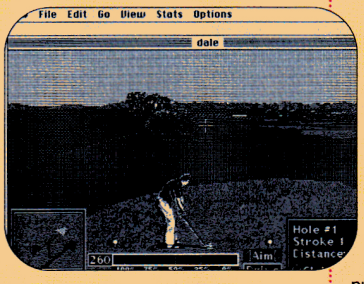
▲

PGA Tour Golf

Hey, golfers — imagine competing with the pros at TPC stadium at Sawgrass with helpful tips from Paul Azinger. Now with **PGA Tour Golf** ($59.95) you can. You can also play at TPC at Avenel, and at the PGA West Stadium course. The simulation includes 60 professional golfers to compete with, and ten pros ready with tips on how to play a hole.

A three-dimensional topographical grid represents the green. You choose your club, and whether to chip, punch, fringe putt, and so on. Pin placement is random, and wind conditions vary — so think about what you're doing. You can consult an overhead map to plan your approach to the pin, and a fly-by view of each hole helps you plot your attack. PGA Tour keeps track of your driving accuracy, par breakers, putting average, and other stats, as well as top money winners.

Announcers keep you up to date on standings and important shots, and instant replays let you gloat. You can play against one to four human opponents.



PGA Tour Golf supports all 256-color and monochrome Macs and is compatible with System 7.0 and MultiFinder. It requires 1 megabyte of RAM and an 800K floppy disk for black-and-white, and 2 megabytes of RAM and a hard disk for color. You can play it with either a mouse or the keyboard. For more information, contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, (800) 245-4525, or circle number 352 on the Reader Service card.

▲

InLine Games

Ready for an off-beat adventure? Help an extra-terrestrial fulfill his mission of visiting states, cities, and landmarks. Return the numeral 3, lost in the bowels of a Mac CPU, to your spreadsheet. Bring back the nose of a stone volcano idol to save the island. InLine Design gives you the opportunity to do all these things with its new releases.

Swamp Gas ($49.95) is a 16-color educational game designed to make learning geography entertaining. You aid the alien on his journey by answering trivia questions about the places he's visiting. Once he's completed his mission and returned to his ship, you can drop into the Alien Arcade for a quick round of Stinky Snakes, Nerdoids, or Quasar Klutzes. Up to four people can play at the same time.

3 in Three ($49.95) is an animated color puzzle game by Cliff Johnson. To help the 3 back into the spreadsheet you have to solve a selection of brain-teasing puzzles. 3 in Three runs in 256 colors on Macs with color monitors.

In **Mutant Beach** ($69.95) the nose of Mohawk, a stone volcano idol, has been stolen. In response, Mohawk has enveloped the island in a cloud that has mutated the inhabitants. As Native Nick, your task is to return Mohawk's nose. Mutant Beach boasts 3-D effects and four-channel multitrack sound for Macs with System 7.0. The package includes four 800K disks and requires 5 megabytes of hard-disk space, plus 2 megabytes of RAM for color.

The three new InLine games run on any Mac and are compatible with System 7.0. Swamp Gas and 3 in Three are compatible with all third-party monitors and accelerators. For more information, contact InLine Design, 5 West Mountain Road, Sharon, CT 06069, (203) 364-5764, or circle number 353 on the Reader Service card.

■

DreamGraphix

As the Macintosh threatens to push the Apple II off the ledge into the wasteland of obsolete personal computers, a dedicated staff of Apple IIGSers fights for its continuance with the release of **DreamGraphix** ($99.95).

DreamWorld Software's debut product is a GS/OS-based color paint program,

supporting all recognized super-hi-res graphics formats.

You can load and display graphics and edit and save pictures; modes include a standard 16-color and 640 dither, 256-color editing, partial 3200-color, fast editing, and a mini 3200-color editor with integrated palette and fat-bits editor.

A drawing-tool set with pencil, line, box, and arc capabilities is included, as well as brush-manipulation tools and full-screen fat-bits mode with four sizes of magnification.

For more information, contact DreamWorld, P.O. Box 830, Iowa City, IA 52244-0830, (319) 338-6491, or circle number 354 on the Reader Service card.

◆

Heatseeker

If you get bogged down manipulating multiple files, you may want to try Sidewinder Software's **Heatseeker** for the Apple II to speed things up. It can move 20 files in 2 seconds, delete 20 files in 3 seconds, and "undelete" 20 files in 4 seconds.

Besides all that power and speed, Heatseeker also offers you the ability to create subdirectories and verify disks. Extras include a binary file viewer that lets you check your data in hexadecimal, ASCII, and decimal at the same time.

Prerelease versions of Heatseeker are available at no cost. Send a blank disk (3.5-inch or 5.25-inch) in a self-addressed envelope, or just a fee of $5 (specify format) to Sidewinder Software, P.O. Box 4341, Naperville, IL 60567-4341.

For more information, circle number 355 on the Reader Service card.

◆

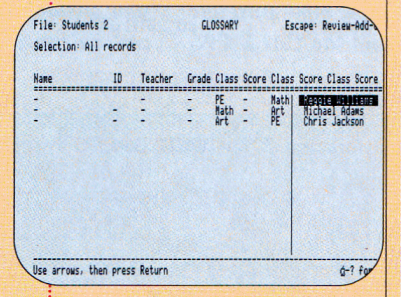
TotalControl

Unleash the capabilities of your AppleWorks 3.0 database and take command of your files with **TotalControl** ($60). It modifies your AppleWorks disk just once and remains in effect from then on.

TotalControl lets you assign categories as "text only" or "numbers only" and set minimum and maximum lengths or values for categories. Pop-up glossaries give you information from a list of records from another database and enter selected material automatically into the category you're working on currently.

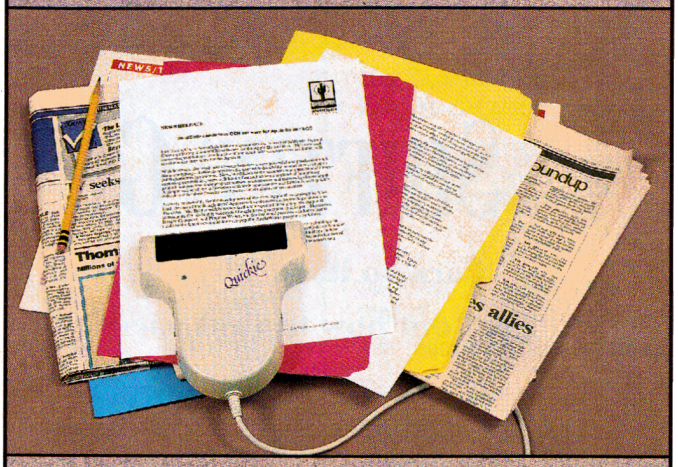
The program can search through several spreadsheet and database files and fill in appropriate categories. A pop-up calculator lets you enter computations into the database in dollar, percentage, and other formats.

You can even assign word-processor text to any category and scroll through it without leaving the database. Thanks to an "auto-return" feature, TotalControl lets you move quickly through categories without hitting a key.



For more information, contact JEM Software, 7578 Lamar Court, Arvada, CO 80003, (303) 422-4766 (303-422-4856 for 24-hour credit-card orders), or circle number 356 on the Reader Service card.

WHY TYPE? InWords!



InWords™ provides a revolutionary new way to enter text into your Apple II. Instead of slow tedious typing, InWords will input information at up to 500 words per minute. By simply passing your Quickie™ scanner over the page, you can create a word processor, data base, or spreadsheet file without typing a single word.



"I highly recommend InWords. It's easy, versatile and extremely useful."

Bruce Shanker
National AppleWorks Users Group

Think of the possibilities. Input lesson plans, contracts, reports, mailing lists, recipes, research materials, newspaper clippings, magazine articles, and books. All of these and more are just a scan away with InWords, a powerful tool to increase your productivity and save time at home, school and work.

InWords and Quickie are so easy to use, there's no reason to wait - stop typing and start scanning. Give your Apple II a powerful upgrade. Get InWords. To order or for more information see your dealer or call (619) 679-9200.

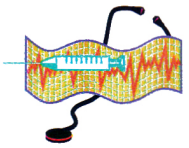
WestCode SOFTWARE

InWords *$129.00*

Requires Quickie or compatible scanner and IIGS or enhanced IIe with 512K

11835 Carmel Mountain Rd., Suite 1304
San Diego, California 92128
(619) 679-9200 Fax (619) 451-0276

Circle 99 on Reader Service Card.



APPLE CLINIC

SHIFTIN' GEARS

Cars do it, so why not your IIGS? Find out how to shift speeds on the fly.

By CECIL FRETWELL

CHANGING SPEED

HOW CAN YOU DETERMINE THE system speed on a IIGS and change it from within a BASIC program?

Eric Higbee
Delaware Water Gap, PA

Why change the speed of the system with a program? Some programs, particularly games, require the slower speed of a GS in emulation (1 megahertz) mode. The code presented here provides a tool that lets you design a program to read and/or change the system speed, launch a program, then restore the system speed.

*The first Applesoft program, BUILD.SPEED (**Listing 1**), sets up an assembly routine called DO.SPEED to change and/or examine the speed. Type in the listing and run it. CHANGE.SPEED (**Listing 2**) uses this assembly-language routine to read and modify the speed of the system.*

The subroutine in Lines 270 through 310 reads the current system speed and stores it in location 794. Thus, a simple PEEK(794) returns the system speed.

A numeral 0 indicates the current speed is normal or slow, while a 1 indicates the current speed is fast.

Line 220 POKEs the speed input from line 210 to location 794, and the CALL 796 causes a change in the system speed. Finally, the demonstration program reads the system speed and displays it to verify that the operation was performed correctly.

APPLE TO IBM

MY BROTHER AND I WOULD like to exchange files between my Apple IIGS and his IBM-compatible machine. Is this possible and how would we go about doing it?

Aaron Jennings
Nacogdoches, TX

If you have access to a Macintosh computer, you can use its Apple File Exchange utility as a medium for transferring your files. Simply pop your ProDOS disk and then an MS-DOS disk into the drive and follow the Mac's on-screen prompts. When it's finished, your original ProDOS file will be on the MS-DOS disk. In the same manner you can translate your brother's IBM files to a format your GS can understand.

Listing 1. BUILD.SPEED sets up an assembly-language routine.

```
100 S = 0
110 FOR I = 768 TO 846
120 READ J : POKE I,J
130 IF I = 794 OR I = 795 THEN 160
140 IF I = 830 THEN 160
150 S = S + I
160 NEXT I
170 READ J
180 IF J = S THEN 210
190 PRINT "Error in entering code"
200 END
210 PRINT "Code entered correctly"
220 PRINT CHR$(4); "BSAVE DO.SPEED",A$300,L$4F
230 END
240 DATA 24,251,194,48,244,0,0,244
250 DATA 32,0,162,3,12,34,0,0
260 DATA 225,104,226,48,56,251,141,26
270 DATA 3,96,0,0,173,26,3,106
280 DATA 106,41,128,141,27,3,173,54
290 DATA 192,41,127,13,27,3,141,54
300 DATA 192,173,26,3,41,1,141,62
310 DATA 3,24,251,194,48,244,0,0
320 DATA 244,32,0,162,3,11,34,0
330 DATA 0,225,226,48,56,251,96
```

Listing 2. CHANGE.SPEED switches your GS' clock rate.

```
90 PRINT CHR$(4); "BLOAD DO.SPEED",A$300
100 S = 0
110 FOR I = 768 TO 846
120 IF I = 794 OR I = 795 THEN 150
130 IF I = 830 THEN 150
140 S = S + I
150 NEXT I
160 IF S = 61334 THEN 190
170 PRINT "Speed change code not loaded"
180 END
190 GOSUB 270
200 PRINT "Enter desired speed"
210 INPUT "SLOW = 0 FAST = 1 [0/1]: ";S
220 POKE 794,S
230 CALL 796
240 PRINT
250 GOSUB 270
260 END
270 CALL 768
280 IF PEEK (794) = 0 THEN PRINT "SLOW SPEED"
290 IF PEEK (794) = 1 THEN PRINT "FAST SPEED"
300 PRINT
310 RETURN
```

HOW THE APPLEWEST WAS WON

Pioneers of Value and Service



We're paving the path to:
- ✻ The Lowest Prices
- ✻ Superior Support
- ✻ Consistent Customer Satisfaction

APPLIED ENGINEERING
Conserver (GS)	74
DataLink 2400 (Internal)	159
DL Express 2400, w/MNP/5	189
GS-RAM Plus, 1 MB	194
PC Transporter (//e, GS)	257
Power Supply (GS)	89
Power Supply (II Plus, //e)	74
RamWorks III, 1 MB	194
Sonic Blaster	94
TransWarp GS (7 MHz/8Kcache)	219
TransWarp GS+ (7 MHz/8Kcache)	299
Vulcan 40 MB (//e or GS)	599

AMR
52Q MB Mini HD w/SCSI	549
105Q MB Mini HD w/SCSI	749
210Q MB Mini HD w/SCSI	1249
3.5 Disk Controller Card (//e)	49
800K 3.5 Drive RC	179

APPLE
GS/OS v5.0.4	39
HyperCard GS	84

APRICORN
Printer Pro (//e, GS Parallel Interface)	49
RamPro GS, 1 MB RC	94

ASIA COMMERCIAL
5.25 Drive (//c, llc+, GS)	95

BEAGLE BROS.
Beagle Compiler	44
Companion +	37
Outliner for AW 3.0	41
Platinum Paint (GS)	59
TO Superfonts	41
TO Superforms	41
TO Text Tools	31
TO Ultra Macros	36

CENTRAL POINT
Copy II Plus v9.1	27

CH PRODUCTS
FlightStick	47
Mach III Joystick	31

RC Watch for Roger's **POWER BURST SPECIALS!**
These prices just can't be beat. And don't forget to call **WEEKLY** for the **LATEST HOT DEALS!**

CLARIS
Appleworks GS v1.1	199
Appleworks 3.0	169

CMS
40 MB Ext HD w/o SCSI	399
81 MB Ext HD w/o SCSI	489

CV TECHNOLOGY
RamFAST SCSI Controller (//e, GS)	187

GLEN BREDON
ProSel 16 w/manual	74

INSYNC
Proterm v2.2 RC	77

LASER
Laser 128 Color System	499
Laser 190A Printer	189

1,000's of products available! Fill out the Reader Service Card for a FREE Catalog

PYGRAPHICS
Music Writer (Level 2, //e or GS)	199

ROGER WAGNER
Hyperstudio v2.1	84

SENSIBLE
Sensible Grammar	52

SEQENTIAL SYSTEMS
Meg 80, 1 MB (//e) RC	149
RAM 80 (80 Column, 64K //e)	34

SEVEN HILLS
GraphicWriter III (GS)	60

SUPRA
2400 Baud External Modem	89
2400 Plus w/MNP-5 & v.42bis	149
9600 Modem w/MNP-5 & v.42bis	519

TECHWARE
Tutor Tech Hypermedia Tool Kit (E, C, GS)	149

TIMEWORKS
Publish It! 4(II Desktop Publishing)	79

VITESSE
Quickie Scanner (//e, GS)	195
Salvation Supreme RC *(Hard drive owners, this is a MUST utility!)*	88

WESTCODE
InWords (OCR Software) RC	79

ZIP
GSX (8 MHz/16K Cache)	199
GSX+ (9 MHz/32K Cache)	249
Zip Chip 8 MHz (//e, //c)	149

MACINTOSH PRODUCTS
AMR 1.4 MB 3.5 Drive	179
AMR 105Q MB MINI HD (17MS)	649
AMR 210Q MB MINI HD (14MS)	1149
Central Point MacTools Deluxe	84
CH Roller Mouse ABD	79
Claris CAD v 2.0	629
Claris FileMaker Pro	209
Claris MacDraw II	279
CMS 40 MB Ext HD	399
CMS 81 MB Ext HD	489
Freesoft White Knight (Telecom)	89
Supra 2400 MacPack Modem	159

HOW TO ORDER:
Orders only: 1-800-438-2883
FAX: 1-619-274-2440
15% ($15/min. restocking fee on refunded items only)
Price quotes & technical support:
1-619-274-1253
8am-5pm PST Monday-Friday
Committed to Value Since 1985

BARNEY our mascot

Roger Coats
P.O. Box 171466
San Diego, CA 92197

Circle 90 on Reader Service Card.

OUR FINE PRINT:
**Certain limitations apply to $5 offer:*
1. Advertised price must be published in this magazine.
2. We reserve the right to question misprints.
3. Limited to items we carry & stock on hand, excluding games.
4. Management reserves the right to make final decision.
We accept the following methods of payment:
• School Purchase Order • VISA & MasterCard
• Bank Wires • Certified Checks • Money Orders • NO C.O.Ds
• Sorry, No Software Refunds
• Not responsible for product compatibility
• Sorry, no shipping, handling,or insurance refunds
• FOB San Diego • We really appreciate your business!

APPLEWORKS CLINIC

By Claris Corporation and the National AppleWorks Users Group

PRINTERS WITH APPLE IIE CARD

I need some help printing from AppleWorks. When I run the program with the Apple IIe Card in my Macintosh LC, I can print both AppleWorks and Macintosh programs on my ImageWriter, but I can't get AppleWorks to print on my LaserWriter LS.

Version 1.0 of the IIe Startup software, which came with your Apple IIe Card, makes the printer port on the LC act as if it's an Apple Super Serial Card in an Apple IIe. This software assumes that the printer recognizes the standard ASCII codes, has one or more built-in character sets, and works when connected to an Apple IIe equipped with a Super Serial Card.

With the exception of ImageWriters, networked LaserWriters (which can emulate an ImageWriter), and some Sekosha printers (which also emulate the ImageWriter), most printers with these features aren't Macintosh compatible because they lack a Macintosh driver.

Version 1.0 of the IIe Startup program lets you use an ImageWriter, ImageWriter compatible, or networked LaserWriter with both Apple II and Mac software, though. No other serial printers support both modes.

A LaserWriter LS, for example, uses the new Apple TrueType technology (a font format that uses the system file to store the directions for drawing each letter, rather than the letter itself). The printer doesn't recognize the standard ASCII codes, doesn't have a built-in character set, and doesn't work when connected to a Super Serial Card in an Apple IIe. Therefore, the LaserWriter LS works with Macintosh software, but not with AppleWorks running under version 1.0 of the IIe Startup program.

The Hewlett-Packard DeskJet printer meets the three criteria described above, but isn't Macintosh compatible; it'll print AppleWorks documents produced on the Apple IIe Card in your Macintosh LC, but you can't drive the printer with Macintosh applications. The HP DeskWriter printer, though, is Macintosh compatible, but doesn't meet the three criteria for Apple II compatibility. That means you can use the DeskWriter with Macintosh programs, but not with AppleWorks running on the IIe Card.

With Apple's recent announcement of version 2.0 of the IIe Startup software, all this will soon change. Instead of trying to emulate a Super Serial Card, the new software converts the AppleWorks text string into QuickDraw routines that will print on any Mac-compatible printer, including Apple's new StyleWriter ink-jet and LaserWriter LS printers. (QuickDraw is a group of programming routines in the Mac's ROM that generates images on screen and for your printer.)

When you print with version 2.0, the IIe Startup software expects to get ImageWriter output, so you must select IMAGEWRITER from the AppleWorks printer menu. Version 2.0 of the IIe Startup software (Apple part number M1222LL/A) costs $29 from your local Apple dealer.

COPYING A SPREADSHEET BLOCK

AppleWorks' Copy command lets me copy a portion of a spreadsheet column or row, but it won't let me copy a block. Is there any way to overcome this problem and get AppleWorks to copy a block in a spreadsheet?

You're probably using an older version of AppleWorks. Version 3.0 includes more than 100 user-requested enhancements, including the ability to copy and move blocks within the spreadsheet. You can upgrade to version 3.0 for $79 directly from Claris. For upgrade information, contact the company at P.O. Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052-8168, (408) 727-8227.

ABOVE @AVG

I use an AppleWorks 3.0 spreadsheet to compute averages. My template displays error messages in the Average column, but the messages disappear when I enter numeric data. What's causing those messages?

AppleWorks' @AVG function computes the sum of all the scores within the cell range you specify. It then divides that sum by the number of numeric entries in those cells.

Your formulas display error messages because there are no numeric entries in the range of cells addressed by the formulas. As a result, you're telling AppleWorks to divide the sum of the scores by zero. Computers (and people) don't like to divide by zero; thus the error message.

For example, imagine that you want to compute the average of cells C10 through G10. The averaging formula is @AVG(C10...G10), but that formula generates ERROR until you enter a number into at least one cell in the specified range.

AppleWorks 3.0 users can employ the @IF function to eliminate these messages. Modify the formula so that it reads @IF(@COUNT(C10...G10)=0,"",@AVG(C10...G10)). The revised formula says, "If the number of numeric entries in cells C10 through G10 equals zero, display a blank. (The two quotation marks signify an "empty" label.) If the number of numeric entries in cells C10 through G10 is greater than zero, display the average of cells C10 through G10."

Earlier versions of AppleWorks don't let you include labels within @IF statements. If you use a version from the AppleWorks 1.x or 2.x series, you should enter the formula @IF(@COUNT(C10...G10)=0,0,@AVG(C10...G10)). It'll display a zero in the cell instead of ERROR.

APPLEWORKS CLINIC IS A FORUM FOR ANSWERING YOUR QUESTIONS ABOUT THE POPULAR INTEGRATED PACKAGE APPLEWORKS — CLASSIC, 3.0, OR GS. ADDRESS YOUR CORRESPONDENCE TO APPLEWORKS CLINIC, *INCIDER/A+*, 80 ELM STREET, PETERBOROUGH, NH 03458. MENTION OF THIRD-PARTY PRODUCTS IN THIS COLUMN DOES NOT IMPLY ENDORSEMENT BY CLARIS CORPORATION. THE NATIONAL APPLEWORKS USERS GROUP (NAUG) IS AN ASSOCIATION OF MORE THAN 15,000 APPLEWORKS USERS. NAUG MEMBERS RECEIVE *APPLEWORKS FORUM*, A 36-PAGE MONTHLY NEWSLETTER WITH TIPS AND INFORMATION ABOUT APPLEWORKS. MEMBERS ALSO GET FREE TELEPHONE SUPPORT FROM THE GROUP'S 150 VOLUNTEER CONSULTANTS AND HAVE ACCESS TO THE NAUG'S PUBLIC-DOMAIN LIBRARY AND MULTILINE APPLEWORKS BULLETIN BOARD. NAUG MEMBERSHIP COSTS $31 PER YEAR, FROM THE NATIONAL APPLEWORKS USERS GROUP, BOX 87453, CANTON, MI 48187, (313) 454-1115.

If you don't have access to a Mac, the most direct route between the two machines is via either a pair of modems and the telephone system, or a null-modem cable.

There are many internal and external modems available for Apple IIs. Most external modems will plug into the GS' serial port, but if you have a IIe you may need to purchase a separate serial card.

If your GS and IBM computers are in the same room (or within 200 feet of each other), you don't need the modems. Just plug the ends of a null-modem cable (available at most electronics dealers) directly into each computer's serial port.

Whichever method you choose, you'll also need some telecommunications software. On the IBM side, I recommend Datastorm Technologies' ***ProComm*** *($50, P.O. Box 1471, Columbia, MO 65205, 314-443-3282) or Forbin Project's* ***QModem*** *($79.95, 124 East 18th Street, Cedar Falls, IA 50613, 319-266-0543).*

On the IIe side, I'd work with Beagle Bros' ***Point-to-Point*** *($99.95, 6215 Ferris Square, Suite 100, San Diego, CA 92121, 619-452-5500) or InSync Software's* ***Proterm*** *($129.95, P.O. Box 22141, Phoenix, AZ 85028, 602-992-5515. Just follow either program's documentation for details on exchanging your files.*

With all this hardware and software, transferring information is quick and accurate. Making the connection using the telephone system, though, can be a bit hectic — especially if you have only one phone line in your house. When you're transferring files, make sure no one picks up an extension — the clicking sound of a lifted receiver will trash your files and perhaps crash both machines.

You should attempt to exchange only text or other data files. Applications and other programs end up being virtually unrecognizable garbage; IBM and Apple are two completely different machines and can't understand each other's applications. ❑

APPLE CLINIC IS A FORUM FOR ANSWERING YOUR QUESTIONS ABOUT APPLE II HARDWARE AND SOFTWARE. ADDRESS YOUR CORRESPONDENCE TO APPLE CLINIC, *inCider/A+*, 80 ELM STREET, PETERBOROUGH, NH 03458. BECAUSE OF THE VOLUME OF LETTERS, MOST WON'T APPEAR IN PRINT, BUT WE'LL TRY TO RESPOND IF YOU ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE.

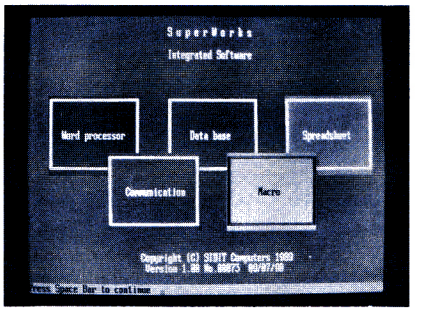
OFFICIAL ANNOUNCEMENT TO READERS

Breakthrough For AppleWorks Users!

The best integrated PC package yet!

Northvale, NJ

Remarkable Technologies announces a breakthrough product which delivers AppleWorks power on an IBM PC or compatible. SuperWorks allows AppleWorks users to step up to a PC along with all their AppleWorks files, utilizing AppleWorks work-alike integrated software.



SuperWorks Features Screen

New features provide complete and full integration of all its capabilities including; spreadsheet (with 3-D capability), database (the easiest to use and one of the most powerful anywhere), word processing (a dynamic and full capability communications package) plus unlimited keystroke macro capability. It takes only 160K in RAM. In addition, SuperWorks allows you to work with your AppleWorks file on an IBM PC.

As a special introductory offer to **inCider** readers, SuperWorks will be made available at the special price of $199.00 (plus $5.00 for shipping and handling). SuperWorks has a regular retail price of $400.00. Send your check or credit card information with order form below to Remarkable Technologies, 245 Pegasus Avenue, Dept. SW, Northvale, NJ 07647. Telephone: 201-784-0900. Fax: 201-767-7463

PAYMENT MUST ACCOMPANY THIS ORDER

SWS

☐ ☐ ☐ EXP. DATE _____

CARD NUMBER _____

SIGNATURE _____

COMPANY _____

ATTENTION _____

ADDRESS _____

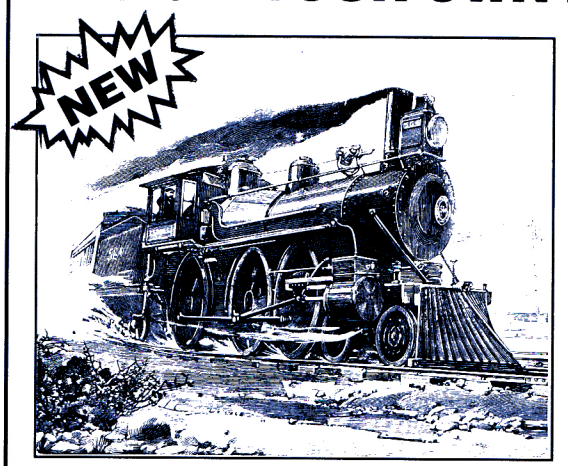
CITY _____

STATE _____ ZIP _____

30 DAY MONEY BACK GUARANTEE

Circle 33 on Reader Service Card.

DESIGN YOUR OWN RAILROAD™



If you've ever had the urge to don a railroad engineer's cap and couple a tender to a locomotive, Design Your Own Railroad could make your dreams come true.

inCider/A+ • August 1991

Apple II/Laser 128, 64K $49.95

IBM, 640K $59.95

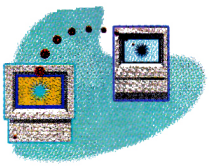
Design Precision, To-scale, (HO, N, Z, O, S, G) Layouts and Run Realistic Railroad Simulations.

To order or receive a free color catalog call:
800-451-4871 or FAX: 503-683-1925

Order by mail: Add $7 shipping fierst program plus $2 ea. additional. Send Visa/MC# (with exp. date) or check.

Abracadata
the source of plan-making software
SINCE 1985
P.O. BOX 2440
EUGENE, OR 97402
(503) 342-3030

Circle 40 on Reader Service Card.



BRIDGING THE GAP

INSTANT COMMUNICATION

Send messages via electronic mail and make those photocopied memos as outdated as the Pony Express.

By GREGG KEIZER

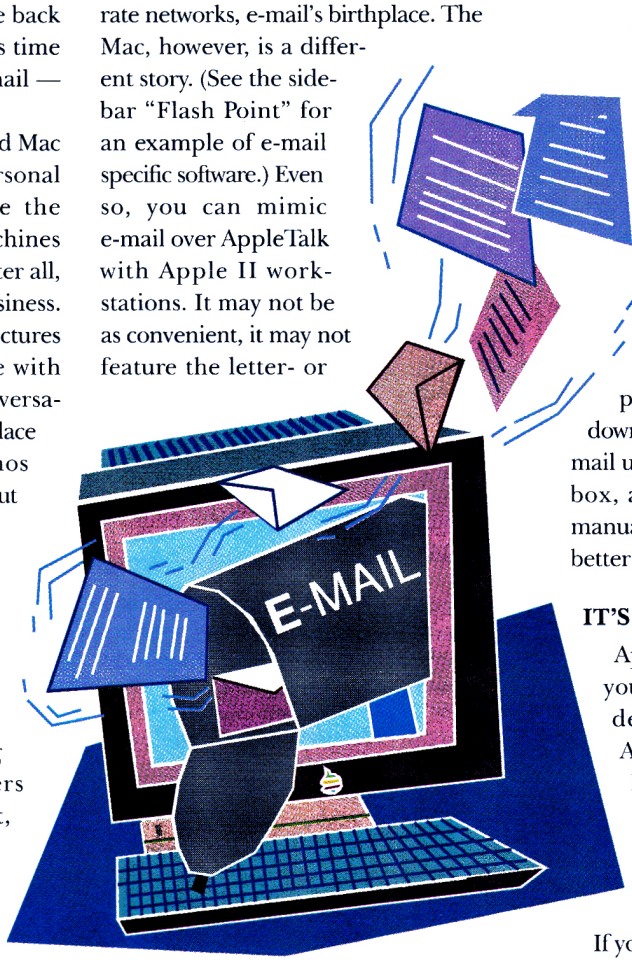
GETTING IN TOUCH WITH OTHERS — quickly and efficiently — is crucial, whether you work in a corporate cubicle or in a classroom. But how many times has the photocopier been down when you had to get a memo to your colleagues? Or how often have you had to repeat tomorrow's assignment for your students in the back row who weren't listening? Well, it's time you turned your attention to the mail — electronic mail, that is.

If you transform every Apple II and Mac in your office or school into a personal message center, you can bridge the communications gap between machines and their users. Communication, after all, is the lifeblood of education and business. In school, you reach students with lectures and handouts, and communicate with other teachers with notes and conversations. In the office, meetings may replace the 50-minute class, and memos supplant photocopied assignments, but the process is too similar to ignore.

If you have an AppleTalk network set up (either **AppleShare** running on a dedicated Mac or a network based on **System 7.0**), you have the infrastructure in place for electronic mail, called *e-mail* by techno junkies. Electronic mail, long established in big business, offers on-demand, personalized contact, even if the recipient isn't in. And that's even more important at school than in the office — how many teachers or kids have a secretary to take messages? And because both Apple II and Mac machines can zap e-mail over AppleTalk, those important announcements can make it to everyone.

ZIP IT, ZAP IT

You won't find e-mail software for the Apple II. That's not surprising, because the IIe and IIGS rarely appear on corporate networks, e-mail's birthplace. The Mac, however, is a different story. (See the sidebar "Flash Point" for an example of e-mail specific software.) Even so, you can mimic e-mail over AppleTalk with Apple II workstations. It may not be as convenient, it may not feature the letter- or memo-like interface of traditional e-mail, but it gets the job done.



The keys to bridging the e-mail gap between Apple IIs and Macs are AppleShare and System 7.0. Both let you zip files between Mac and Apple II computers once you've connected those machines with **LocalTalk**-compatible cabling. (For detailed information about setting up an AppleShare or System 7.0-managed network, see "In the Network Groove," September 1991, p. 40.) Remember, though, that Apple IIe workstations can talk to other computers only via AppleShare, because System 7.0 doesn't support Apple IIe connections currently.

Real e-mail — not the sort we'll construct here — has lots of snappy extras, from mass-mail-style addressing that posts a message with a whole crowd of people, to automatic notes that tell you mail awaits. You can't expect our ad hoc e-mail to do everything, but it can handle the basics. You'll be able to send and receive messages in the form of files, deposit those messages to one or more people, and retrieve your mail from a personal, private mailbox. On the downside, you won't know when you have mail unless you actually look in your mailbox, and you'll have to post messages manually to the correct mailbox. Still, it's better — much better — than nothing.

IT'S A PRIVILEGE

AppleShare or System 7.0? Which will you use as your e-mail engine? That depends on whether you're using AppleShare already. Setting aside a Mac as an AppleShare file server just for e-mail doesn't make sense, but if your network runs currently under AppleShare, you can adapt it easily for electronic communications.

If your school, workplace, or home office

Illustration • Elizabeth V. Auer

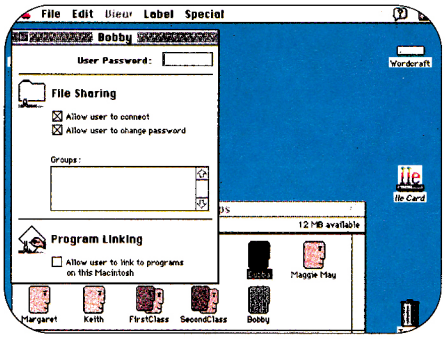


Figure 1. Identify "Bobby" as a user of the System 7.0 electronic mail center.

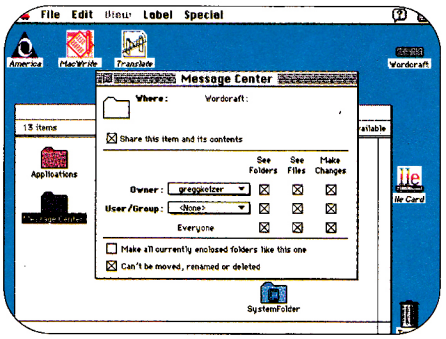


Figure 2. Determine file-sharing privileges for the MessageCenter folder.

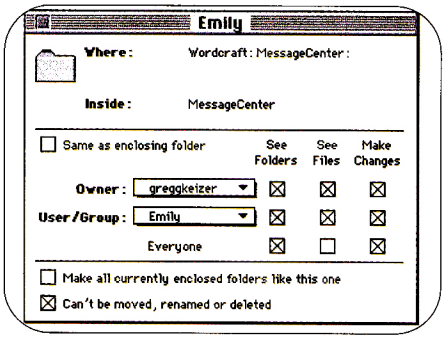


Figure 3. One example of an e-mail user's privileges.

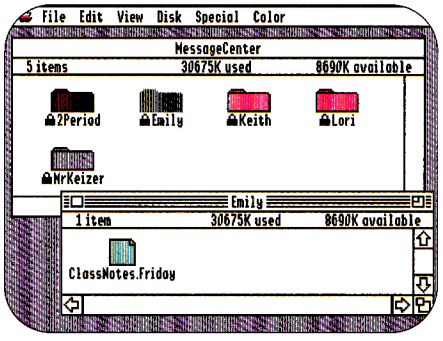


Figure 4. A user checks her folder to see whether she has mail.

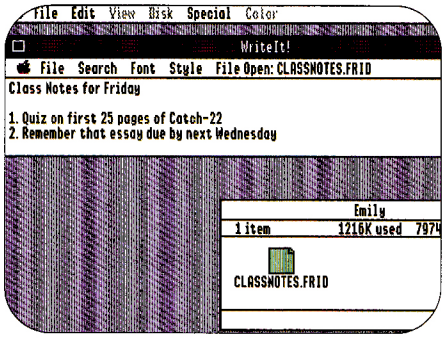


Figure 5. Access your mail quickly with a mini word processor such as WriteIt!.

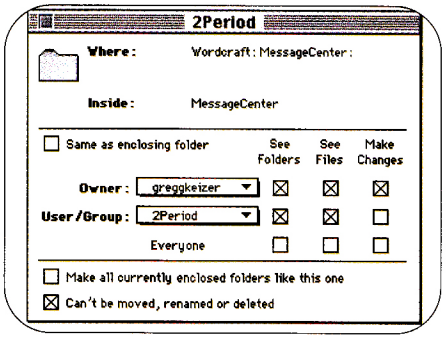


Figure 6. Setting up a folder for a group of users.

gets by without AppleShare — and you're using a mix of Macs and IIGSes — you can detour high network costs by installing System 7.0, the Mac's new operating system, on at least one 2-megabyte Macintosh. (See "Long Live 7.0," August 1991, p. 24, for information on System 7.0's importance to Mac/Apple II connectivity, and for general instructions on creating a System 7.0-managed network.)

Most of the time you spend building an e-mail system will be in registering users, making and naming folders, and assigning *access privileges*, or rights, to those folders. Setting privileges is one of the most confusing parts of linking Apple computers with either AppleShare or System 7.0. Privileges let you keep files and their contents safe from prying eyes or share information with everyone on the network, and they let you create places to simply drop off files, much like a metaphorical in-box. That's what you'll do to build your collection of electronic mailboxes.

SYSTEM 7.0 MAIL

No matter which bridge you build — AppleShare or System 7.0 —customizing it to handle e-mail is basically the same procedure. With that in mind, let's see what it takes to create e-mail under System 7.0.

Your first job is to name all the people who'll be using the System 7.0 Macintosh as an electronic mail center. Head to the Control Panel (under the *Apple* menu) and double-click on *Users & Groups*. *Create a New User* by pressing Command-N, name the user icon (*Bobby*, say), double-click on the icon, and enter the password the user will type to access e-mail. (See **Figure 1**.) Both boxes under *File Sharing* should be checked. Repeat for all users, up to System 7.0's maximum of 100.

The next step is to make a folder to share with others on the AppleTalk network. Name it something like *MessageCenter*. (If any users will write, send, or retrieve messages with **AppleWorks**, or any other ProDOS-8 program, all folders must meet ProDOS's subdirectory naming requirements, which forbids spaces and allows a maximum of 15 characters.) Now pull down the *File* menu and select *Sharing*. In the resulting pop-up window, you'll begin to set privileges. (See **Figure 2**.)

Check the box at the top marked *Share this item and its contents* and the box at the bottom marked *Can't be moved, renamed, or deleted*. The first turns sharing on for this folder, while the second ensures that no one can remove or rename the e-mail setup. The three rows in the middle of the window — *Owner*, *User/Group*, and *Everyone* — determine who has access to the folder. For each row there are three columns — *See Folders*, *See Files*, and *Make Changes*. By checking some boxes and not others, you determine who can deposit and retrieve e-mail.

You'll probably be the "owner" of all e-mail folders, because you're creating the system. Only a folder's owner can change its privileges. *User/group* lets you name a single user or group of users that can access the folder. *Everyone* means simply everyone who connects to the network. For this primary folder, check all nine boxes.

Now, open the *MessageCenter* folder and create additional folders inside it, one for every e-mail user, each named for that user. You'll have to set these folders' privileges separately, a time-consuming task, but there's no way around it. Select *Sharing* for each folder, and set privileges as you see in **Figure 3**. Note that the owner (you) still has complete privileges, as does the user whose name appears on the folder. Everyone else, though, has only *See Folders* and *Make Changes* privileges.

See Folders lets you open the folder, an important part of the e-mail process, as you'll see in a moment. The *Make Changes* privilege is what actually lets each e-mail user post messages to others' mailboxes.

FLASH POINT

Several full-featured electronic-mail programs get Macintoshes talking. But only one comes from a widely known Apple II publisher. FLASH, from Beagle Bros, bills itself as file-transfer software, but it can meet your e-mail needs quite nicely if every machine on your AppleTalk network is a Mac ($199.95, 6215 Ferris Square, Suite 100, San Diego, CA 92121, 619-452-5500).

Flash works in the background, sending files to any Macintosh on the network. Just create a To folder for each person on the net. Drop one or more files into the appropriate To folder and Flash does the rest. It sends the file(s) across the network to the right Mac, places it in a From folder that carries your name, sounds a tone on the recipient's machine, and opens a window to let him or her know something's arrived.

Want to just chat? Flash includes a desk accessory that lets you call anyone connected to the network. Within any application, you can open the desk accessory, send a quick message, and even hold a two-way conversation. Either part of Flash — file transfer or chatting — can take care of most of your e-mail needs. File transfer slows down both the sending and the receiving Mac slightly, but the drag isn't dramatic.

Because Flash works with any Mac equipped with System 6.0 or later, and because it doesn't require a hard-disk drive, it's perfect for schools loaded with machines that can't handle System 7.0, such as 1-megabyte Classics or older Mac Pluses or SEs.

It's surprising that Beagle Bros, with its long Apple II history, hasn't created an Apple IIGS version of Flash that would allow fast file transfer between Macs and GSes. With schools mixing more Macs and Apples IIs, such a cross-machine utility could become the de facto e-mail substitute for the classroom. **— G.K.**

But by restricting the *See Files* privilege, you make it impossible for others to see the contents of the folder.

ALWAYS RING TWICE

Sending, reading, and replying to e-mail on this system is simple, if not slick. Connect with the Macintosh mail-center computer via AppleTalk from any other Mac, or any Apple IIGS. Get to the Control Panel (IIGS) or Chooser (Mac), select the *AppleShare* icon, pick the Mac mail machine, enter your name and password, and choose the shared *MessageCenter* folder. An AppleShare icon named *MessageCenter* appears on your Mac or GS desktop.

Use your favorite word processor to write your e-mail message, then save it as a text file (sometimes listed as *ASCII*) to simplify things on the other end. Don't save it to your own mail folder, though — instead, save it to the folder of the person to whom you're sending the message. Here's where the *See Folders* privilege comes into play, for without it you wouldn't be able to open anyone else's folder from the *Save* dialog box. Tag the e-mail message file with a descriptive name, something like *FmKeith.9.9.91*, to let the recipient know who the mail's from and when it was written.

To read a message, all you need do is log on to the Mac mail machine, check for mail (by looking in your folder), and if there's some waiting, launch a word processor and open the text file. Using text files ensures that all recipients, no matter what word processor they use, no matter whether logging on from a Macintosh or a IIGS, can read all their mail easily. (See **Figure 4**.)

One way to speed up this process from an Apple IIGS is to use a desk-accessory mini word processor such as C. K. Haun's **WriteIt!**. With WriteIt! under the *Apple* menu, you can log onto the *MessageCenter* folder, check your mailbox, and read your mail or write new messages — all without going through the time-consuming process of launching AppleWorks or **AppleWorks GS**. (See **Figure 5**.)

Other file-sharing techniques of System 7.0 and AppleShare make it possible to post a message to an entire group of users. Simply create a group, *2Period* perhaps, assign the appropriate users to that group through 7.0's *User & Group* control-panel device (*cdev*) or through AppleShare's *Administration* software, and make a folder for the group within *MessageCenter*. Set the *2Period* folder's privileges to *See Folder* and *See Files* under *User/Group* and leave all three boxes in the *Everyone* row blank. (See **Figure 6**.) Drop class assignments or announcements into this bulletin-board folder and everyone in the group — everyone in the class — can read, but not change, them.

IS IT MAIL YET?

Down-and-dirty e-mail like this lacks some important characteristics, foremost among them the ability to warn someone that mail's waiting. You have to log onto the AppleTalk network and actually check your mailbox folder to see whether it holds messages. That's inconvenient at best. Unfortunately, there's no solution, at least not for Apple IIe and IIGS users.

But even with its limitations, this cross-platform e-mail can improve communication among teachers, and between teachers and students. In a small office, coworkers can fling memos and status reports across the network electronically.

So don't wait for a letter in your mailbox. Communicate today — right this minute — from your Macintosh or Apple II. ❑

PRODUCT INFORMATION

AppleShare File Server, $799
LocalTalk Connector Kit, $75/computer
System 7.0 Personal Upgrade Kit, $99
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(800) 776-2333
(408) 974-1010

AppleWorks 3.0, $249
AppleWorks GS, $299
Claris Corporation
5201 Patrick Henry Drive
Santa Clara, CA 95052-8168
(408) 727-8227

WriteIt!
RavenWare Software
22045 McClellan Road
Cupertino, CA 95014
user-determined fee

WRITE TO CONTRIBUTING EDITOR GREGG KEIZER AT 614 LINDEN STREET, SHREVEPORT, LA 71104. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

KILLER DEALS!

We Want to be Your One Stop for Quality Products at Superior Prices!

Why Buy From **LRO**? **FREE** Technical Support. **NO** Restocking Fee. **NO** Credit Card Fee(*). School & University P.O.'s **OK**. Overnight Shipping Available. Satisfaction **Guaranteed**.

KILLER DRIVES ✓ 40MB SCSI $299

HARD DRIVES

NCS Pro 40	**$ 299.00**
NCS Pro 80	$ 419.00
NCS Pro 120	**$ 499.00**
NCS Pro 200	$ 779.00

The New Concepts Storage Pro Series portable SCSI Hard Drives are an affordable answer to your storage needs using the highly proven and reliable Conner line of mechanisms. Featuring dual Power and SCSI ports, you can easily add up to 6 additional SCSI devices to the chain. Designed for the Apple IIGs, IIe and Macintosh, the NC Pro sports the same dimensions and color as the Æ or Apple Drive 3.5!



RamFast DMA w/256L	$ 179.00
Apple HiSpeed DMA	$ 99.00
Vitesse Salvation Supreme	$ 99.00
NCS 45meg Removable	$ 569.00
Chinon CD-ROM	$ 549.00
Tape Backup Drive	$CALL!

EDUCATION

Specials of the Month

Apple *Hypercard* GS	$ 79.00
HyperStudio Audio Digitizer	$ 84.00
Quickie Handscanner	$ 91.00
WestCode *InWords* OCR	$ 79.00
Enhanced *VisionPlus/Visionary* Real-Time Video Digitizer	$279.00
Spring Branch GS Numerics	$ 89.00
Mac Numerics	$ 144.00

KILLER MEMORY & ACCELERATORS

MEMORY CARDS

GS RAM Expansion	1MB	2MB	4MB
CV-Tech RAM GS	**$139.**	$189.	$285.
MPD GS-4 RAM	$ 99.	**$139.**	$239.
GS-Sauce SIMM card	$129.	$189.	$285.
Æ GS RAM III	$149.	$215.	$335.
OctoRAM GS (SIMM)	$149.	$189.	$285.

Apple IIe/IIc/IIc+ Expansion	256K	512K	1MB
Super Expander IIe	$ 69.	$ 89.	$109.
Z-RAM Ultra II (c)	$185.	$205.	$239.
Æ Ramworks III	$129.	$149.	$181
Æ Ram Express II	$159.	$175.	$209

ACCELERATORS GALORE

ZIP Technology

ZIP GS 8MHz/16K cache	$ 199.00
ZIP GS 9 MHz/16k Cache	$ 229.00
ZIP 8MHz Apple IIe/IIc/+	$ 135.00
Æ Transwarp GS 8MHz	$ 229.00
Æ Transwarp GS 8MHz/32K	$ 294.00
Æ 9MHz TWGS Upgrade	$ 109.00
Æ 32 cache upgrade	$ 85.00

Heavy Duty Power Supplies!

Apple IIgs 7 amp strong	$ 69.00
Apple IIe 5 amp strong	$ 59.00

MEMORY & ACCESSORIES

1 meg/80ns Expansion	**$51.00**
256K/100ns Expansion	$ 19.00
GS 512K–1.25mb Quickpak	$ 49.00
Æ Ram Ultra 256K/100ns sets	$ 13.00
Æ 3.5" Disk Drive 800K	**$187.00**
Æ 3.5" Drive HD 1.44mb	**$229.00**
Apple IIe Enhacement kit	$ 59.00
Apple IIe 64K/80 column cd	$ 59.00

All memory is backed by our 5 year 'Hassle Free' replacement Warranty!

KILLER SOFTWARE & ENTERTAINMENT

TOOLBOX

The GATE GS	$ 45.00
FTA Photonix II	$ 40.00
Space Fox	$ 49.00

ELECTRONIC ARTS

Tunnels of Armageddon GS	$ 29.00
Chessmaster 2100 GS	$ 29.00
Mavis Beacon Typing GS	$ 32.00

TRIAD SOFTWARE

Disk Labeler GS (v2.0)	$ 24.00
HyperCard GS XCMDs	$CALL!
HyperStudio XCMDs	$CALL!

PROGRAMMING TOOLS

Genesys GS by SSSi	$ 79.00
Orca/C – Learn package	$129.00
Orca/Pascal – Learn package	$129.00

Fly the HoverBlade



fighter craft while dodging and blasting your way through 10 treacherous regions of walls, trees, mountains and many other dangerous obstacles. HoverBlade features a huge 3D perspective, a full stereo sound system, unbelievable graphics and animation (similar to *Space Harrier*™), and it's the fastest and most challenging game you'll ever play.

Now for the GS! (1 megabyte memory required) **$29**

Space Harrier™ is a registered trademark of Sega

We have 100's of Products by Hewlett Packard, Orange Micro, Applied Engineering, Daystar, Panasonic and many others available and in stock for your Apple II or Macintosh.

Can't Find It? Call us!

We *have it* or we *can get it* for You at the *Very Best Price – Anywhere!!*

FAX: (815) 338-4332
Tech Support: (815) 338-8746
International: (815) 338-8658

LRO COMPUTER SALES

CALL NOW • TOLL FREE

(800) 869-9152

Illinois Residents Call (815) 338-8685

665 West Jackson Street, Woodstock, IL 60098

JNC 9/91

(*)No surcharge for Visa/MC. Add $5 for FedEx COD Service. Add $4 for UPS COD Service. Illinois residents add 6.5% sales tax. No sales tax for out of state purchases. All Hardware may be returned within 30 days of receipt with no restocking fee (Must have RMA#). Shipping charges vary. Prices & availability subject to change without notice. So There!

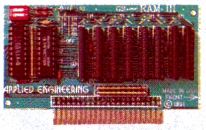
©1991 OCP Marketing Group

Preferred Products at Preferred Prices with . . .

NEW!

GS-Ram III

Applied Engineering's GS-Ram III uses the new low cost, high performance 1 Mb x 4 chips to ensure low power consumption and less heat. It expands to 4 Mb (6 Mb w/AE's 2Mb expander) and its compact size (4" x 2 1/2") leaves plenty of room for other peripherals.



GS-Ram III 1Mb $139
GS-Ram III 2Mb $199
GS-Ram III 3Mb $259
GS-Ram III 4Mb $319

. . . . . Memory Expansion

Applied Engineering
New! Uses inexpensive 1 Mb by 4 chips!
GS-Ram III 1 Mb *(GS)* $139
GS-Ram III 2 Mb *(GS)* $199
GS-Ram III 4 Mb *(GS)* $319
GS-Ram Plus 1 Mb *(GS)* $205
GS-Ram Plus 2 Mb *(GS)* $292
GS-Ram Ultra *(GS)* ..... Call
RamWorks III 256K *(IIe)* $139
RamWorks III 1 Mb *(IIe)* $227
RamFactor 256K *(IIe, II+)* $175
RamFactor 1 Mb *(IIe, II+)* $264
RamCharger $139
Ram Express II 256K *(IIc, IIc+)* $146
Ram Express II 1 Mb *(IIc, IIc+)* $205
Z-Ram Ultra 2 (with clock)
256K $199
1 Mb $285
Memory Chips
1 Mb Chips (bank) $59
256K Chips (bank) $24

. . . . . Communications

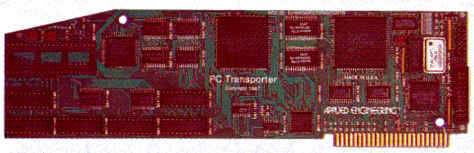
Applied Engineering
SPECIAL! — *FREE* ReadyLink Software with purchase of DataLink 1200 ..... $95
DataLink 2400 bps *(int.)* $160
DL 2400 *w/SendFAX! (GS)* $199
DataLink Express 2400 *(ext.)* $169
DL/X 2400 *w/MNP-5* $199
DL/X 2400 *w/MNP-5 & FAX* $239
ZOOM Modems
7 Year Warranty • Parts & Labor
Zoom MX 2400 *(ext.)* $98
Zoom/Modem V.42bis $199
Modem Cables $15
US Robotics
Courier HST Dual Standard $949
Macintosh
DataLink LC $229
DLLC 68882 Chip $119
QuadraLink Multi-Port Serial Board for Mac II's $199

. . . . . Accelerators and Co-Processors

TransWarp GS *(Make your GS 2 1/2 times faster!)* $229
TransWarp GS w/32K Cache $318
TWGS 32K Cache *(Make your TransWarp GS 22% faster!)* $79
TransWarp *(Original, reliable accelerator for II, II+ and IIe)* $99
Z-80 Plus *(Run Apple CPM programs on your GS, IIe or II+)* $131

PC TRANSPORTER CORNER

"Run IBM Software on your Apple for a fraction of the cost of a clone!"



"Best prices, best service, best selection"

PC Transporter $239
IIgs Kit $36
IIe/II+ Kit $29
MS DOS 4.01 ..... $85
Transdrives
Combo 5.25" & 3.5" reads & writes 360K & 720K $289
Dual 5.25" $284
Single 5.25" $189
3.5" 720K Add-on $99
5.25" Add-on $125

PCT Peripherals
101 Key Keyboard w/cable $79
Keytronics ADB Keyboard $139
Headstart M1152C Digital Monitor w/cable $159
Intel 8087-2 Math Chip $139

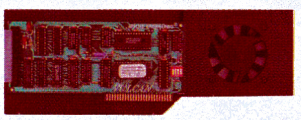
- PCT SPECIALS -
ABC All-In-One Business Software — includes WP w/mail merge, DB, spreadsheet, sales lead mgr., accessories, & complete accounting system. Perfect for small business mgt. or sales professionals.
Special $89.95

. . . . R.G.B. Monitors/Video

Applied Engineering
ColorLink RGB (for RamWorks) $103
Digital Vision
Computer Eyes GS *(color)* $199
Computer Eyes *(B&W)* $108
HeadStart
New! M1152C Digital Monitor for IIe and/or PCT (includes cable) $159
Magnavox
CM135 Analog/Digital RGB Monitor (includes digital cable-IIe, GS) ... $289
IIGS Analog Cable $25

. . . . . Printers/Interfaces

Applied Engineering
Parallel Pro $77
Buffer Pro 256K $109
Serial Pro $99
Panasonic
KXP 1180 ..... $199.50
KXP 1124 ..... $319.50
New Star
NX 1001 ..... $189
Seikosha
SP-2000AP (Imagewriter comp.) $249



Vulcan 40 & 100 Mb

The Cadillac of Apple hard drives given a "5-star" rating by InCider. Vulcan comes complete with a heavy duty power supply, 16 bit ultra fast controller (GS), built-in CDA, pseudo-slotting, and support for GS/OS, ProDOS, DOS 3.3, Pascal 1.3 & CP/M.

Now Only —

Vulcan 40 Mb..... $569
Vulcan 100 Mb $949

. . . . . Additional Hardware

Applied Engineering
Audio Animator *(GS)* $169
Conserver Drive Cable $17
Conserver Fan *(GS)* $77
I/O 32 ..... $85
Phasor *(GS, IIe, II+)* $77
Sonic Blaster *(GS)* $74.95
TimeMaster HO *(GS, IIe, II+)* $79
IIe/II+ Power Supply $59.95
IIgs Power Supply $89
CH Products
MACH III Joystick $39
MACH IV Plus $69
Mirage ADB/Quad $14.95
Kensington
System Saver *(II+, IIe)* $69
System Saver GS $75
Turbo Mouse ADB (GS, Mac) $124
KeyTronics
ADB Keyboard (PCT/GS) $139
Vitesse
Quickie Scanner *(GS, IIe)* $199
Quickie w/InWords $269

BEST VALUE!



Zoom MX2400 with ReadyLink

Now is the perfect time to add telecommunications to your system with the Zoom MX2400, 100% Hayes compatible modem. This full-featured modem is covered by a 7 year warranty and comes with ReadyLink, the powerful communications software that is easy to use. You'll also receive free on-line time to popular services, so you can be up and running right away!

MX2400, ReadyLink, Cable $129
— with v.42 bis (9600 B) $229

. . . . . Storage Devices

Applied Engineering
Vulcan Hard Drives include controller card and come pre-formatted with the latest system (specify machine).
Vulcan 20 Mb $499
Vulcan 40 Mb $569
Vulcan 100 Mb $949
Vulcan high-speed controller card ... Call
AE Disk Drives
New! 3.5" 1.6 Mb *(GS)* $237
3.5" 800K *(GS, IIe, IIc+)* $189
3.5" Controller Card *(IIe, II+)* $65
5.25" Disk Drive *(all Apple II's)* $124
5.25" Controller Card *(IIe, II+)* $55
Apple
High Speed SCSI *(GS, IIe)* $109
EMAC
Impact 20 Mb FAST SCSI Hard Drive — 2 year warranty! $359
w/Apple SCSI $459
Impact 80 Mb SCSI $699
w/Apple SCSI $799

Fax in your school P.O.! (214) 247-8151

. . . . . Accessories

Mouse Pads $7.95
Ribbons
Imagewriter I/II (black) $3.50
Value Pack (5 ribbons) $14.50
Imagewriter I/II (color) $5.99
Value Pack (3 ribbons) $16.50
Blank Disks
3.5 DS/DD (pkg. of 10) $9.95
3.5 DS/DD (pkg. of 50) $39.95
5.25 (pkg. of 10) $6.00
Power
QVS Surge/Modem protector Don't get ZAPPED!! $34.95
TrippLite Omnipower 450 UPS gives 34 min. backup time $359

FEDERAL EXPRESS

VISA

To Order, Call 1-800-327-7234

P.O. Box 815828 • Dallas, Texas 75381 • FAX (214) 247-8151

MasterCard

. . . . . Preferred Service = Satisfied Customers



TIMEWORKS
Publish It! 4

Voted "Best Desktop Publishing Program of the Decade" by Classroom Learning, Publish It! 4 requires no previous DTP experience to produce top-quality, professional looking, colorful documents. Publish It! 4 supports laser printers and most popular dot matrix printers.

Special $79.95

. . . . . Education

(Teacher's editions, lab packs and network versions available on many titles.) Please call!

Advanced Idea's
Audobon Wildlife Adventures Grizzley Bears *or* Whales *GS* $39.50
A.E.C.
Spanish *or* French Vocabulary *or* Grammar $19.50
Return of the Dinosaurs $28.50
Barron's
Computer SAT $31.50
Britannica
Algebra 1st *or* 2nd Semester $32.50
Algebra 1st & 2nd Semester $48.50
Revolution *or* Designasauras(GS) $27.50
Brøderbund
Bannermania $24.50
Carmen Sandiego GS (World, Europe, USA & Time) $29.50
Geometry $54.50
Katies Farm *or* McGee $24.95
McGee at the Fun Fair $24.95
Playroom $24.95
Science Tool Kit Master $51.50
Module 1 *or* 2 ..... $27.50
VCR Companion $32.50
Davidson & Associates
Alge *or* Math Blaster Plus $29.95
Grammar Gremlins $29.50
Math Blaster Mystery $29.95
Read & Roll *or* Spell it Plus $32.50
Word Attack Plus $32.50
Decision Development Corp.
Math #2:Bldg. on Word Prblms. ... $27.50
Math #3:Advanced Word Prblms. . $27.50
Science #2:Geology $27.50
Learning Company
Math *or* Reader Rabbit $24.50
Talking Reader Rabbit GS $32.50
Writing and Publishing Cntr. $36.95
MECC
Calendar Crafter, home $32.50
Oregon Trail $24.50
USA *or* World Geograph *GS* $52.50
Fraction Word *or* Number Munch. $23.50
Grade Manager $39.50
PC Globe
GeoQuiz GS $29.95
GeoPuzzle IIe *or* GS $24.95
Software Toolworks
Mavis Beacon Typing *GS* $32.50
Mavis Beacon Typing *IIe* $26.50
Weekly Reader
New Talking Alphabet, Shapes *or* Opposites $29.50
Reading Comprehension $32.50
Stickey Bear ABC's, Numbers Opposites *or* Shapes $24.50
Other Stickey Bear Titles ..... Call

. . . . . Entertainment

Battle Chess GS $31.95
Bismark $11.95
Blockout GS $22.50
Car Builder $34.95
Crystal Quest $32.95
New! Dragon Wars $34.95
Flight Simulator II $31.95
Grand Prix GS $27.95
Hunt for Red October $22.50
Jack Nicklaus Golf GS $34.50
Maniac Mansion $19.50
Pipe Dreams $24.50
Scrabble $27.50
Space Ace GS $36.95
Test Drive II, The Duel GS $29.50
Tetris $24.95
The Party Quiz Game $29.95
2088: The Cryllian Mission 1 *or* 2 $35.95
Vegas Gambler $22.50
Xenocide $31.95

. . . . . Communications

Applied Engineering
ReadyLink $59.50
Beagle Brothers
Point to Point $59.95
TimeOut Telecom $39.50
Insync
Proterm $79.50
Morgan Davis
Modem Works $49.00
Proline BBS Software $169.00

. . . . . Graphics

Abracadata
Design Your Own Architecture, Interiors *or* Landscape) *GS* $53.95
Apple II $42.50
All Libraries $22.50
Apple
Hypercard GS $89.00
Beagle Brothers
Platinum Paint $58.95
Brøderbund
New Printshop $29.95
Printshop GS $36.50
PS Companion GS $29.95
PS Graphic Libraries GS $17.50
PS Graphics Libraries IIe $22.50
Roger Wagner
Hyperstudio $84.50
Graphics Exchg. or Macro Mate ... $32.50
Softswitch $39.50



Design your own home architecture, interiors or landscape with Abracadata's popular new series. Each program offers pre-drawn shapes, side views, scaling, and much more! For home design, interior planning and landscaping, Abracadata has the answer.

Apple II $42.50
Apple IIGs $53.95
Libraries (all Apple II's) . $22.50

. . . . . Productivity

Beagle Brothers
AppleWorks 3.0 Companion $23.50
Beagle Write GS $59.95
Outliner for AppleWorks 3.0 ..... $42.50
TimeOut Decision Pak $89.50
TimeOut Performance Pak $69.50
TimeOut Power Pak $32.50
TimeOut ReportWriter $48.50
TimeOut Style Pak $79.50
TimeOut Textools $32.50
TimeOut SuperForms *or* SuperFonts $42.50

— SPECIAL —
Purchase $50 or more in software and receive Copy II+ v.8.4 for FREE! That's an $11.95 value!

Claris
Appleworks 3.0 ..... $169.00
Appleworks GS $199.00
AW 3.0 10 Pack (5.25 *or* 3.5) $899.00
Timeworks
Graph-it $53.00
Publish-it 4 ..... $79.95

Other Titles
Bank Street Writer Plus $49.50
Labels, Labels, Labels $24.95
Quicken $37.95
Word Perfect IIe *or* GS $109.95

. . . . . Utilities

Applied Engineering Upgrades
AppleWorks 3.0 Expander $15.00
Vulcan Utilities "v1.4.6" – *New* $15.00
PC Transporter "v2.04 " – *New* $15.00
Other Upgrades ..... Call
Central Point Software
Copy II+ "v9.1" $27.50
Copy II+ "v8.4" $11.95
Glen Bredon
Prosel 16 v8.7 ..... $74.95
Prosel 8 ..... $35.00
Micol
Micol Basic IIe $59.95
Micol Basic GS $89.95
Soft Spoken
Cross-Works "v2.0" $68.50
Vitesse
Harmony $33.50
Salvation Deliverance, Exorcisor *or* Rennaissance $29.50
Salvation Supreme Pack $119.95
Salvation Wings $49.50
Westcode
Inwords (requires scanner) $78.00

. . . . . Hot Macintosh Titles

Publish It! Easy $149.00
Kid Pix $32.50
Quicken $42.50
Oids $32.50
Robosport $39.50
Sim City $37.50
Carmen Sandiego World or USA .. $37.50
Instant Library of Quotes $35.95
Type! $24.95



PQ: The Party Quiz Game

Host your own game show with PQ. Match wits with your friends or play alone. Buzz-in to answer questions on history, the arts, science, geography, sports and entertainment. PQ includes 4 quick response controllers that will allow up to four people to play at once. PQ is adjustable between "just for fun" or "go for the throat" modes, and works with all Apple Computers or compatibles.

Special $29.95



Seiko DataGraph 2001

A complete hardware/software system that puts a scheduling/message center right on your wrist! Store appointments, birthdates and important messages up to 23 months in advance on your Seiko 2001 Stainless Steel watch.

Compatible with Apple II+, IIe and IIc.

Special $39.00

Why buy from us?

- ***15 day money back guarantee on hardware returned in new condition. Sorry, no refunds on printers, monitors, CPU's or software.***
- ***We handle only the industry's best hardware and software.***
- ***All memory cards come with factory installed & tested RAM.***
- ***We're nice guys that want to help. We want our business to grow because of repeat customers & word of mouth.***
- ***UPS and Federal Express Next Day Service available.***

Preferred Computing

To Order Call Toll-Free **1-800-327-7234**

FAX your Order: 214-247-8151

Questions and Customer Service Call 214-484-5464

VISA, MasterCard and COD orders accepted. Order by phone, mail or FAX. School and Government Purchase Order's welcome. Special and Sale items may be limited quantities. Prices and Specifications are subject to change without notice. Please verify product compatibility before ordering. Texas residents add 7.25% sales tax.

Q-DRIVE VS. RESOURCE CENTRAL SCSI DRIVE

I remember my first hard drive fondly. It was 1979, and a company called Corvus Data Systems had just introduced its Winchester Technology 8-inch-diameter 10-megabyte hard drive. Imagine 88 floppies on a single high-speed storage device. Okay, so everything wasn't perfect — it weighed about 60 pounds, took up most of a desktop, made enough noise to wake up somebody sleeping in the next room, and retailed for the astonishingly low price (for the time) of $6000. Things sure have changed.



★ ★ ★ ★ ★

Quality Computers
20200 Nine Mile Rd.
Box 665
St. Clair Shores
MI 48080
(800) 443-6697

- Apple IIGS/enhanced IIe hard drive
- $499 40MB w/SCSI
  $699 100MB w/SCSI

★ ★ ★ ★ ½

Resource Central
P.O. Box 11250
Overland Park
KS 66207
(913) 469-6502

- SCSI hard drive
- $479 50MB
  $599 100MB

Instead of an extremely expensive specialized accessory, hard drives are now considered necessities for most businesspeople, as well families and educators. Hard drives are now lightweight, quiet, fast, and less expensive than equivalent storage on floppies.

Hard drives for the Apple II have been available for many years, but usually at much higher prices than Macintosh or MS-DOS equivalents. Well, here's some good news: Two diehard manufacturers still support the Apple II with reasonably priced products. Quality Computers and Resource Central are selling external hard drives for the Apple II, complete with utility software and technical support.

Both companies have chosen to use drives that follow the SCSI (pronounced "scuzzy," *small-computer-systems interface*) standard. SCSI is also compatible with other types of block-I/O devices and other computers. If you have an Apple II, you'll also need to purchase a SCSI card.

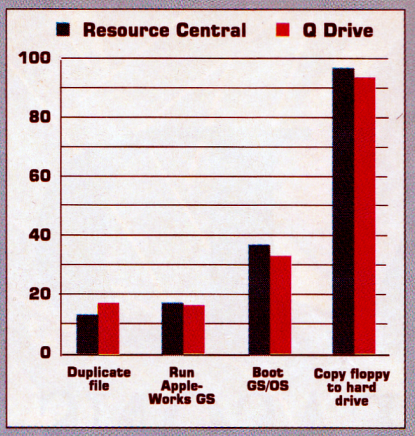
I really had to work to come up with any differences between the drives that were worth mentioning. They're almost identical externally, as they sport the same footprint and even cases of the same color. Both drives have standard dual 50-pin-AMP SCSI connectors instead of the substandard DB-25 connectors that some other hard-drive makers have used. The back of each case has a standard power connector, switch, fuse, and SCSI-device selector switch.

Quality Computers' Q-Drive comes as either a 40-megabyte or 100-megabyte drive. It also includes three 3.5-inch utility disks that store the standard IIGS System files, and a 5.25-inch disk for IIe and Laser users. It also includes a Macintosh disk with a formatting utility.

When you first boot the Q-Drive on an Apple II it determines whether you're using a IIGS or IIe computer and configures the drive with the correct system

Photography • Larry Dunn

software automatically. The manual is clear and comprehensive, and includes instructions for setting up the drive with various Apple II models and different SCSI cards. The Q-Drive comes loaded with shareware and public-domain games, utilities, and demos. On the downside, it's slightly difficult for IIe users to delete unwanted 16-bit programs; many include hidden resource forks. The manual recommends that IIe users transfer all files they want to keep either to floppies or to another hard-drive partition, then erase the partition to remove all files.



SPEED TESTS

Tests were run on a standard-speed IIgs with an Apple High Speed SCSI Card (direct memory address) without any other devices attached to the SCSI port. Exact performance will vary depending on a system's hardware configuration (all times in seconds).

	RC	Q-D
Boot to GS/OS Finder	37	32
Run AppleWorks GS	17	16
Copy floppy (797K) to hard drive	95	93
Duplicate file	14	17

CHECK YOUR RESOURCES

Resource Central is the hardware arm of the popular magazine *A2-Central*. Its hard drive consists of a 50- or 100-megabyte Quantum mechanism with the latest version of the IIGS System Software preinstalled.

If you have a IIe system you'll have to delete the file *PRODOS* manually from the drive and replace it with a standard ProDOS 8 file — a daunting task indeed for a beginner.

The drive comes with 16 megabytes of text files, including all back issues of *A2-Central* on disk, plus samples of the company's other disk products, the entire set of Apple II developer notes, and a collection of hundreds of IIGS icons.

The Resource Central drive's power supply will adjust for any potential from 90 to 240 volts automatically, and the case has two switched power sockets. The bottom of the Resource Central case has a clear access panel that gives you entry to the drive's terminator resistors so that you can check easily whether they're installed, and change them if necessary.

Which hard disk's for you? First, the Q-Drive earns high marks for its comprehensive manual, automatic system-software configuration, and large assortment of software.

On the other hand, the Resource Central drive's switched power outlets are handy additions for users suffering from power-cord overload, and the back issues of *A2-Central* make for interesting reading and a handy reference.

Both hard-disk drives come with Apple's GS/OS system software, but neither provides any additional SCSI support software. The addition of even basic SCSI utilities to either package would be most welcome.

Make no mistake, these drives are high-quality products with excellent technical support, and you won't go wrong purchasing either one. When it comes to buying one of these drives, we'll leave it up to you to split hairs.

Philip Chien
Titusville, FL

TALE OF THE TAPE

	Q-Drive	Resource Central SCSI Hard Drive
Product		
Retail price	$499 40MB with Apple High Speed SCSI $389 without $699 100MB with Apple High Speed SCSI $589 without	$479 50MB SCSI card not included $599 100MB SCSI card not included
Options	RamFast SCSI Card extra $70 with drive ($179.95 retail)	Apple High Speed SCSI $119 RamFast SCSI Card $209 Cirtech SCSI Card $129
Drive mechanism	Conner Peripherals CP3040 CP3100 3.5"	Quantum 3.5"
Distributor	Quality Computers	Resource Central
Hardware requirements	Apple IIGS, enhanced IIe, or compatible	Apple IIGS, enhanced IIe, or compatible
Software format	3.5" and 5.25" copyable disks	3.5" copyable disks
Warranty	1-year 30-day money-back guarantee	2-year 30-day money-back guarantee
Summary	good hardware with excellent selection of public-domain software	excellent hardware with good database of reference information

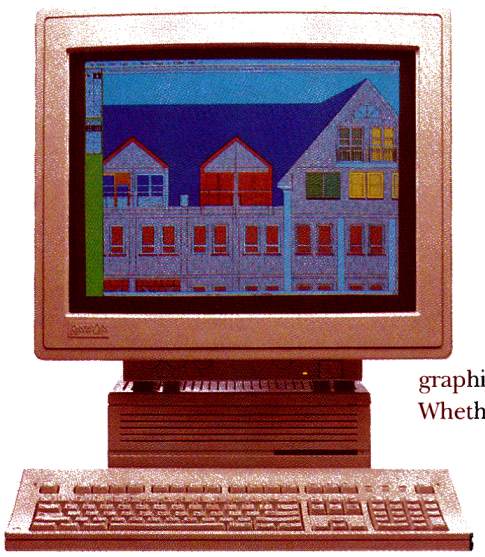
CAD FOR ALL REASONS

For armchair architecture, science-class illustrations, and do-it-yourself home projects, computer-aided-design software gives you the first tool you'll need to bring your vision to life.

By CYNTHIA E. FIELD, Ph.D.
CONTRIBUTING EDITOR

ANYTHING YOU CAN DREAM OF in your mind's eye you can conceptualize on the computer screen — that's the beauty of CAD. As written language gives form to our thoughts, so the software language of computer graphics gives structure to our creative impulses — as easily as tugging a pull-down menu or clicking on a drawing-tool icon. Whether your project is a woodworking pattern, a home-office floor plan, a needlework design, or a Rube Goldberg-style widget, you'll find a bounty of CAD programs to help you get started.

Best of all, you probably already have many of the skills you need to translate your vision into reality: Design programs share many of the same features you may have experimented with in paint packages or desktop-publishing software — tool icons (producing a selection of basic geometric shapes), fill patterns, and optional grids and rulers, to name a few, as well as customary graphics-editing commands, such as flip, nudge, rotate, zoom, move to back (or front), and lock (or unlock). Viewing your completed design is often as easy as dragging the program's horizontal and vertical scroll bars or switching to preview mode. Macintosh products, and BeagleDraw for the Apple IIGS, also support assorted typefaces, sizes, and styles (more on individual products below).



DESIGNER'S CHOICE

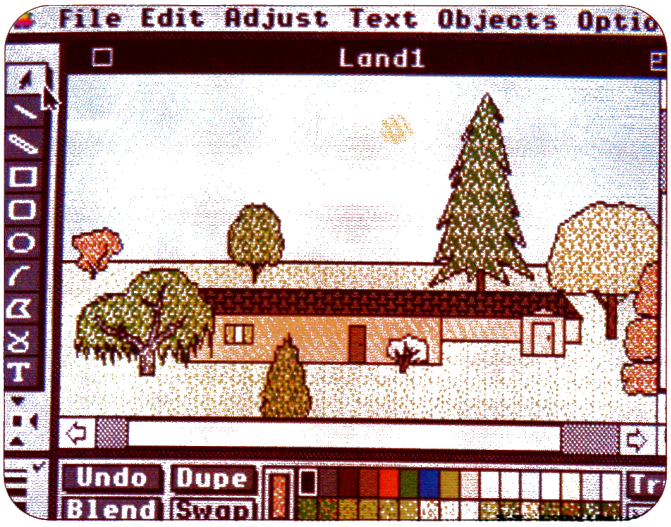
What makes CAD software different from other types of graphics applications, then? First, like all drawing programs (as distinguished from paint programs), design software features *object-oriented* graphics you create with the mouse. Whether it's a flow-chart rectangle, a dimension line with arrows at either end, or a block of descriptive text, each component of your design is a discrete object you can select, move, resize, reshape, or delete — without affecting other parts of your drawing. In addition, you build your drawing in layers, a capability that lets you develop a floor plan, say, and then overlay it with electrical and plumbing layouts. Or you might design a prototype of your latest invention and add an overlay with text labels and notations. Some professional CAD programs support 250 or more individual layers, which you can redesign, rename, hide, or rearrange at will.

This modular personality means that object-oriented graphics are by far the easiest kind with which to work, and that your printout will consist of hard-edged, high-resolution, outlined objects ideal for diagrams, plans, and explanatory illustrations. What you can't do is edit your objects pixel by pixel, as you do in paint programs.

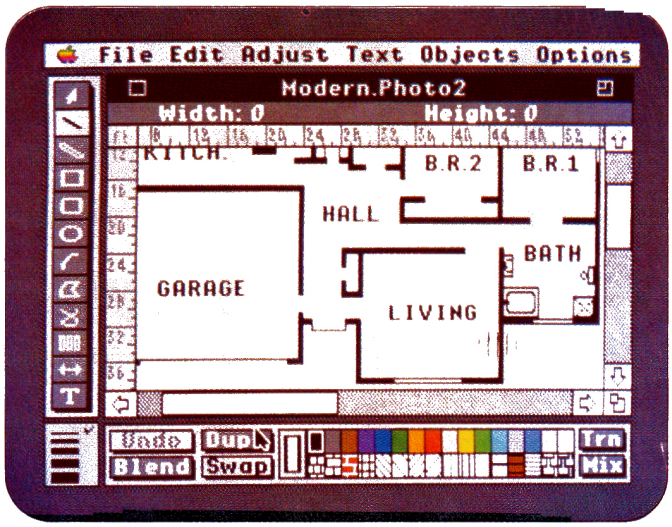
A user-customizable grid is another hallmark of drawing products. Like graph paper, a grid is composed of evenly spaced vertical and horizontal lines that help you orient the elements of your design. Most programs let you make a grid "magnetic" to "snap" objects into proper position. You can also display vertical and horizontal rulers denominated in English or metric units and scale them appropriately according

Photography • Larry Dunn


Letters
are
thin
not
HOME AND
HOME FURNISHINGS
PLAIN P
This is the kind of project that all
a surplus of 3- and 4-foot lengths of lum
try work and other do-it-yourself proje
shown here was born of just a few minutes' contemplation
some old spare boards.
To build a structurally sound table, it's a good idea to use on-
ly seasoned wood. Green or found boards should
doors for at least six months, and you should feed
or twisted planks to the shop stove. Pallet boards
crate planks are good for workshop projects, but on
tenth of the wood will be usable.
28" TO 32"
TOP
XO-25
LIGHT BLUE
Actual paint colors may vary
A428
Reception
A328
Lemon Mist
E307
Chantilly
A228
Butterfly
E207
Candy Lime
28A
A128
Golden Ochre
IBM #665-065
100
Colonial Maple
223
On Oak
Provincial
211
Deck
up
up
Den
Kitchen
Garage
Main Level
Kitch
6'x10'9"
Bedroom
11' x 10'9"
ladder
Living/Dining Ro
24'1" x
inexpensive source of epoxy,
and use it: It's a better gap-
than resorcinol glue.
u'll find it saves time and wood
edrill holes so 8- or 10-penny fin-
g nails won't split the lumber. Be
e to clamp the pieces of the apron
the legs securely while the glue be-
een them sets.
A finished table should have its top
oards edge-fitted and glued. If—on
he other hand—you intend your plain
pine table for rough use, just make the
unit strong and neat, and never mind
the cracks.
If the boards you have on hand are
too short or too thin to use for a kitch-
en table, you might consider mak-
ing a typewriter table. Two-by-fours
are not useful in kitchen-table con-
struction but can be ripped into per-
fectly proportioned typing-table legs
that taper from 1-5/8" on the top to
1-1/4" at the bottom. Typewriter
tables should be 26" to 30" long by
18" to 20" wide. They ought to be
27" high for manual typewriters and
an inch or two shorter for electric
models. You might also think about
building a television stand, which
should be about 18" high with an 18"
X 24" top.
The basic table design can be
adapted by adding drawers, and any
homebuilt unit can be made more at-
tractive by filling nail holes and giv-
ing the work a hand-rubbed finish or
a coat of paint. However, it's far easier
to build plain carpentered tables—
constructed of pine, off-color oak, or
unidentified packing lumber—and fin-
ish them with just some sealer and a
little linseed oil.



Design Your Own Home: Architecture offers specialized tools (stud and dimension, for instance) and custom library symbols.



Design Your Own Home: Landscape sports depictions of plant growth and its own library of symbols, including shrubs and trees.

to your application. While you might select an eighth-inch-to-one-foot scale for a landscape plan, for example, you might choose an eighth-inch-to-1-mile scale for a map design.

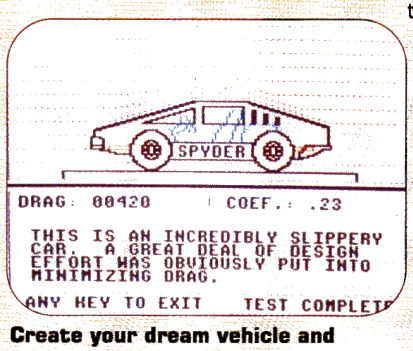
Although the drawing board itself may look like an ordinary piece of graph paper, the toolbox accompanying each program is more fun than those "rolling rulers" you see advertised on TV. Instead of trying to draw a perfect circle with a compass and that tiny pencil — and invariably poking a hole in your paper — click on the circle tool, choose the method with which you'd like to create the circle (you can draw from its perimeter or the center), and "rubberband": Press the mouse button, drag, and release the shape into place. Want to measure and display the circle's diameter? It's as easy as clicking on a dimensioning tool or an analogous menu option.

As in so many other areas of modern-day computing (when you add TimeOut SuperFonts to AppleWorks 3.0, are you word processing or desktop publishing?), the distinction between drawing programs and "authentic" CAD programs begins to blur. That's why for us the *D* in *CAD* can mean "drawing," "drafting," *or* "design." Basically, CAD programs include all the usual drawing tools plus an assortment of more powerful capabilities, such as zoom functions and automatic dimensioning, or items geared to a specific purpose, such as

CAD AT PLAY

No doubt about it: You can accomplish real work with a CAD program. A quick perusal of our feature article or the accompanying "Ultimate CAD" sidebar proves that. But computer-aided design has a lighter side, too. Take, for example, three CAD products for hobbyists: Car Builder, Design Your Own Railroad, and Glidepath.

Whether you're 8 or 80, if you like cars, you'll enjoy **Car Builder**, an automotive-engineering program for the Apple II. Consider the various components that make up a vehicle's mechanical design. Select a chassis, then choose from an assortment of engines, transmissions, fuel tanks, suspension and steering elements, tires, and brakes. Add a body and some windows to complete your automobile's design. You can even create a trademark decal if you like. Car Builder tests the aerodynamic properties of your prototype in a simulated wind tunnel and then rates the car's performance, handling, and braking on a test track. An electronic "engineer" provides feedback on drag, high-speed cornering, and downhill braking, among other factors.



Create your dream vehicle and tinker around with Car Builder.

Optimum Resource's program seems accurate: We replicated as closely as possible the two vehicles in our household — an American-made sedan and a Japanese-made minivan. Comments from Car Builder's engineer were right in sync with our actual driving experience. When it's time to buy your next automobile, Car Builder may prove to be as valuable a resource as Car & Driver magazine.

If your father monopolized your Lionel train set when you were a kid, take heart — with model-railroad programs from Abracadata. Among the company's offerings are **Design Your Own Railroad**, **Design Your Own Train**, and **Run Your Own Train**. Macintosh users can enjoy the first two products, while versions of all three programs are available for 64K Apple IIs. GS users should be warned that the programs' awkward mouse support and dated graphics are a letdown, though.

Design Your Own Railroad provides the tools you need to draw layouts to scale of G, HO, N, O, S, and Z model railroads, covering a lot more space than the average rec room — up to 9999 feet in all. The program lets you save and print designs, complete with operational switches, cargo, passengers, destinations, and custom-colored locomotives and cars. The program's simulation supports up to 46 cars — as many as 16 per train running on multilevel tracks. You can perform realistic yard operations, too, such as coupling and uncoupling. Just stay alert to avoid crashes!

Design Your Own Train, a "computer-aided transit-design system," lets you create model-train, subway, bus, or trolley

symbol libraries for architecture, electronics, landscaping, or interior design.

For instance, as noted above, drawing products, like paint and desktop publishing packages, usually offer an assortment of fill patterns — but in a CAD program, some of those patterns may be designed to represent common building materials, such as steel, concrete, or even fiberglass roof shingles. Besides geometric primitives such as circles, rectangles, and polygons (not to mention freehand drawing tools), CAD products often provide advanced capabilities such as Bezier-curve (non-uniform curves), parallel-line, and perpendicular-line tools, as well.

And in addition to supporting popular printers such as the Apple's ImageWriter II and the LaserWriter line, some CAD products include built-in drivers for high-end plotters, such as those made by Hewlett-Packard and Houston Instrument. Plotters use pens of various colors to produce smooth, unbroken line drawings and can generally accommodate large paper sizes.

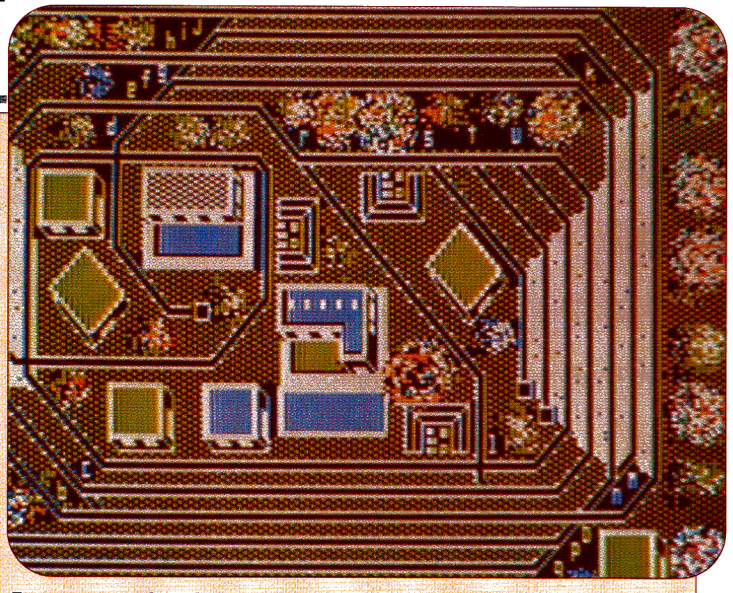
Take it from us: Once you experiment with software that offers "smart" geometric shapes and a level of precision only a computer can provide, you'll wince at the thought of going back to protractors, T-squares — and gum erasers. From the abundance of Apple II and Macintosh CAD products available, we selected a dozen programs priced at $500 or less (half cost less than $100) to review here. Mail-order discounting means even greater savings, with "street prices" 30 percent or more below suggested retail.

Keeping a watchful eye on affordability doesn't mean we've ignored the needs of professional designers; you can take a look at some pricier and more full-featured products in the accompanying "Ultimate CAD" sidebar. Students, teachers, and craftspeople, however, will probably find that depending on their hardware setup, the following products offer incomparable value. For the Apple II family, take a look at **Cadapple**, the **Complete CADDRAW System**, and **discoverCAD II**. For the Apple IIGS there's **BeagleDraw**. For the Macintosh you can pick from **Blueprint**, **MacDraft**, **MacDraw II**, and **Super 3D**. Thanks to Abracadata, "the source of plan-making software," both Apple II and Mac users can enjoy products in the **Design Your Own Home** series: **Architecture**, **Interiors**, and **Landscape**, as well as a new entry — **The Instant Decorator**, an interior-decorating consultant on disk.

Most programs support at least limited color on color-capable computers such as the Apple IIGS and the Mac LC. Memory requirements for CAD products run the gamut from 48K for certain Apple II programs through 2 megabytes or more for powerful Mac packages. Remember, though, that because not all design programs offer every feature we've described, your best bet for learning more about any product that piques your interest is to contact its publisher directly.

CADAPPLE 3.5

Perhaps the most full-featured CAD program for the Apple II family, Cadapple from Prime Computer runs under the Pascal operating system. Adding an ellipse means pressing *A* (*Add*) from the main menu and then *E* (*Ellipse*) from the *Add* menu. In typical Pascal fashion, most features require you to press the first letter



Create up to four independent layouts with two dozen switches on straight and curved track in Design Your Own Train.

layouts. Each design can sport up to four independently operated trains running on straight and curved tracks and controlled by some two dozen operational switches. Run Your Own Train puts you in the engineer's seat, where you can traverse each layout from top view or from inside the locomotive's cab. Getting started with railroad modeling is easy: A ready-to-use **Train Library** provides a dozen layouts compatible with all three of the company's train products.

Pardon the pun, but recreational designers can set their sights even higher with **Glidepath**, a 64K Apple II flight simulator from HRM Software. Recommended for flyers aged 10 to adult, the program is billed as an educational product (reproducible student worksheets are provided), but it's also suitable for personal enjoyment.

Sure, you're bound to pick up some physics savoir faire, especially after a few "hard landings." But you'll eventually discover ways to modify flight parameters such as altitude, pitch, and velocity to keep your craft from stalling during its trajectory. Experiment with Glidepath's five imaginatively named, ready-made gliders — Glorious Glenda and Dangerous Dan, for instance — or use the program's drawing board to design your own custom craft. You can control a number of design parameters, including wing span (length), wing chord (width), wing center of pressure (distance from the nose to the center of the wing), and overall glider length.

Select any of five terrains — from desert to jungle to oceanic islands — and run the Glidepath simulator. The program does all the complicated math for you and displays the flight's progress on screen. An instant-replay option provides a smooth rendering of each animated sequence.

Looking for a unique outlet for your creativity? If so, consider the recreational CAD products described here. Whether you're a frustrated DeLorean, a would-be railroad tycoon, or an aeronautical-engineering wannabe, you'll discover that CAD products such as Car Builder, Design Your Own Railroad, and Glidepath aren't just fun, they're space-saving — and safe!

— C.F.

of a command's name. While this approach makes Cadapple logical, the program's "split personality" on GS systems may challenge your patience as you switch continuously from graphics-screen drawing mode to text-screen command mode. (On other Apple II systems you can overlay text at the bottom of the graphics display.)

COMPLETE CADDRAW SYSTEM

To users accustomed to the GS or the Mac, Hearlihy's Complete CADDRAW System for the Apple II will seem primitive if not downright MS-DOS-like. The drawing module supports only hi-res graphics and requires an accompanying screen-dump program (**Triple Dump**) to print designs on dot-matrix models. With yet a third product, **Cookie Cutter**, you can edit or design symbol libraries. Budget-strapped schools equipped with older Apple IIs may find this three-part system's bargain price worth the inconvenience, but we'd hate to see students turned off to design by the awkward interface and nonintuitive, code-numbered commands.

DISCOVERCAD II

Like CADDRAW, Hearlihy's discoverCAD II, also for the Apple II, is beginning to show its age. To its credit, the program's features are organized in a mousetext-style menu bar that's fairly intuitive and easy to access with a mouse. But virtually every move you make is accompanied by a side trip to the program disk drive, which slows progress considerably, even on a GS running in fast mode. On the plus side, this double-hi-res graphics product is accompanied by well-written courseware manuals. The program supports plotters, but not dot-matrix printers. For that, you need Triple Dump or a similar screen-printing program.

BEAGLEDRAW 1.3

BeagleDraw is easy to learn and to use. Running exclusively on the Apple IIGS, it boasts special features, such as the ability to display your choice of 16 colors from a palette of 4096. A corner-radius command lets you specify the degree of roundness of round rectangles, while the auto-select command puts selection handles on each object immediately after it's drawn. Graphics-editing features, including object grouping and alignment, abound. Your designs can grow to 1024 pages. BeagleDraw supports ImageWriter IIs and LaserWriters.

BLUEPRINT 2.0

One of the least-costly professional two-dimensional CAD programs for the Mac,

ULTIMATE CAD

If you're a Mac-using architect, draftsperson, or engineer — or would like to be — try test-driving one or more of the powerful computer-aided-design products featured here. These extraordinary programs offer the standard complement of features described in the accompanying article, but they also boast many high-performance capabilities, only a handful of which we have room to mention in the "nutshell reviews" below. The programs' respective publishers (see the accompanying "Product Information" box for details) can provide you with additional data. Some offer free demonstration disks.

Claris CAD 2.0

With its logical "Tools, Methods, and Modifiers" approach to 2D (two-dimensional) drafting, Claris CAD supports American and international design standards and simplifies drawing tasks with a Graphic Guide system that locates critical geometric points automatically. Besides the extensive user's guide, resources include on-line help, a tutorial manual/disk combination, a VHS instructional videotape, and free technical support. **Claris Graphics Translator 1.1**, an add-on program for Claris CAD as well as other computer-aided-design programs, interchanges drawings among industry-standard formats.

DesignCAD 2D/3D

If you'd like to embellish 2D drawings with special 3D effects, take a close look at DesignCAD 2D/3D. The program offers four views — top, front, side, and isometric — with real-time rotation. Relishing DesignCAD's possibilities is as easy as manually re-orienting the sample fighter-jet drawing with the hand tool, an elegant and surprisingly fast process even on our Mac LC. DesignCAD 2D/3D also features svelte floating palettes, extensive file-format compatibility, and 500 ready-to-use symbols.

Dreams 1.1

Dreams takes a refreshingly non-technical approach to computer-aided design. Don't get us wrong: CAD capabilities are well represented, but they're described in plain English in all Dreams documentation. Tutorials guide you step by step through creation of an organizational chart and an office floor plan. This Innovative Data Design product comes with a two-disk **Graphics Library** that includes, among other niceties, computer logic symbols, business clip art, and ready-to-personalize stationery. An extensive **Architectural Library** of symbols is available for $99.

Generic CADD

Generic CADD from Generic Software is a complete 2D design and drafting package — preliminary sketches to finished production-quality drawings. Features include precision line and arc tools, specialized symbols and fills, snap tools and automatic dimension updating, and zooming and panning to any scale or perspective. A **Student Edition**, marketed by Addison-Wesley• Benjamin/Cummings at a significantly reduced price, includes the complete software package plus a tutorial manual with ten step-by-step lessons and a reference section covering the program's commands and functions.

MiniCAD+ 3.0

MiniCAD+ integrates 2D/3D design with a relational database and spreadsheet. Linking information such as catalog number, pricing, and supplier to each object means you can automate job-cost estimates. The program's "smart" cursor enhances drawing precision by identifying relevant geometric points automatically; the MiniPascal macro language lets you create custom tools and options. Land surveyors, architects, geographers, and physical scientists may be interested in another Graphsoft product — **ContoursPro** — a high-precision contouring and 3D surface-modeling system.

Graphsoft's Blueprint sports a "smart" cursor that changes appearance when it approaches significant geometric locations, such as midpoints or intersections. Other noteworthy features include keyboard data entry, 1000X zoom, extensive file-format support, and exquisite sample drawings — a campus layout, a residential floor plan, a catamaran design, and detailed keel/rudder schematics among them.

MACDRAFT 2.1

For a program whose documentation is easy enough for beginners to understand, MacDraft from Innovative Data Design offers a surprisingly rich complement of features, including the ability to zoom in 32X, rotate objects in 1-degree increments, display the Mac's 16.8 million colors, and export files in high-quality detail to word-processing and desktop-publishing programs via a proprietary *PictScript* format. Like the company's pricier counterpart, **Dreams 1.1** (see the accompanying sidebar "Ultimate CAD"), MacDraft comes with a free two-disk clip-art library with office-furnishing and data-processing logic symbols, organizational-chart elements, and logos.

MACDRAW II 1.1

Its tidy, uncluttered screen, basic tools, and unassuming pattern palette belie MacDraw II's considerable underlying power. Among this Claris program's multilayer capabilities are various pen sizes and line styles, assorted rulers and scales, and built-in plotter support. We particularly like the animated hypermedia-style tutorial "tours" and on-line help, plus the spell checker. (Low-cost foreign-language dictionaries are available.) Other special MacDraw II features include the ability to create 35-millimeter color slides and overhead transparencies as well as to print color separations. Professional designers requiring even more sophisticated tools, advanced file support, or compatibility with the Pantone matching system should consider **MacDraw Pro**, just released as this article went to press.

SUPER 3D 2.5

If you'd like to visualize your creations in three dimensions, check out Super 3D, a modeling and animation program for the Mac from Silicon Beach. Spin wheels, light-source shading options, and "tweening" controls help produce realistic 3D animated effects. Although it provides numerous drawing tools, Super 3D isn't so much a computer-aided-*design* program as it is a computer-aided *visualization* product.

DESIGN YOUR OWN HOME

If instead of a generic CAD program, you'd like one that's dedicated to the specific project you have in mind, consider

PowerDraw 3.0

Because Engineered Software claims that PowerDraw projects run the gamut from embroidery designs to boat hulls to crime-scene reconstruction, we aren't surprised that the four sample disks accompanying the program include 2D site plans, 3D building plans, a colorful V8 engine, a computer circuit board, a flow chart, and a map of Schenectady, New York. A host of third-party enhancements, such as **PowerDraw Formatted Details** (construction standards and notations), enhance the program's already copious built-in resources.

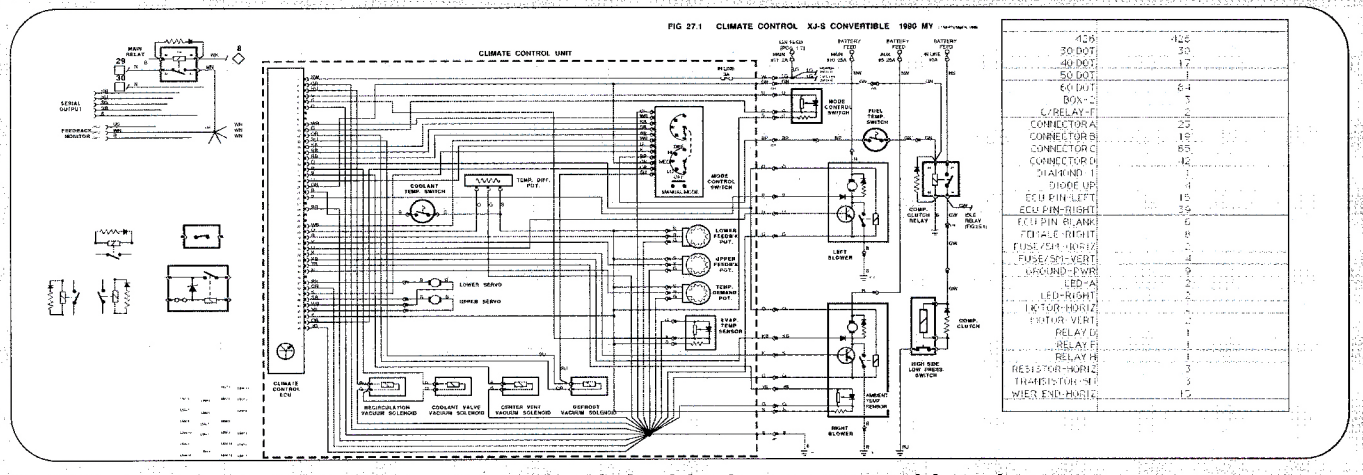
VersaCAD Macintosh 3.01

You expect professional CAD systems to offer a rich assortment of 2D design tools. VersaCAD Macintosh is no exception. But among its unique offerings are a collection of HyperCard stacks that offer on-line help, create bills of materials, process text, catalog your designs visually, and convert colors for Mac-to-MS-DOS transfers and vice versa. Also included are 3D visualization features and the ability to create custom fonts by drawing a character set within the program itself. This and other compelling features make VersaCAD Macintosh a complete design solution. (A similar product, lower-priced and 2D-only — **VersaCAD Drafter Macintosh** — was released at press time.)

Virtus WalkThrough 1.0

Here's one name you can take literally. Billed as a designer's "idea processor," WalkThrough's forte is converting 2D drawings to 3D, letting you navigate the renderings as if you were taking an honest-to-goodness tour of the model. Use the mouse to peek into windows, move from room to room, or pull back for a bird's-eye view. WalkThrough can give your clients a "virtual reality" visualization of a finished project — without investing in an expensive computer workstation.

— C.F.



MiniCAD+ integrates design with a spreadsheet and a relational database to automate job costing.

Architecture, Interiors, or **Landscape** from the Design Your Own Home series. All three products are available in Apple II, IIGS, and Mac formats. Mac and GS versions boast the easy-to-use Apple Human Interface, but even Apple II-family versions sport pull-down menus and support the mouse, though in a nonstandard way.

Each product in the series offers custom tools for its particular genre. Architecture, for example, provides a special stud tool that lets you dimension lumber and set spacing for walls and partitions. Landscape's features include the ability to "age" a plant and to print nursery shopping lists.

All three products include pertinent symbol libraries — electrical-device symbols, furnishings, ready-to-place shrubs and trees. Ready-made design libraries with dozens of house plans are available for all three products, as well. Choose the layout that suits your project best and edit it as you see fit.

The Instant Decorator, a text-only product, isn't CAD software, strictly speaking, but it's a useful adjunct. The program teaches you how to decorate your home or office according to Lois Munford's "two-season design" system, which strives to achieve balance among the seasons represented by a room's architecture and furnishings.

PICTURE THIS

If the best way to learn is to build on what you already know, what could be more constructive than a computer-aided design program for your Apple II or Mac? CAD products, with their easy-to-use object-oriented graphics, are essential investments for any Apple user with design in mind.

Whether you prefer a dedicated program such as Design Your Own Home: Landscape or a generic one such as MacDraft, whether you're a craftsperson, a homebody, a weekend do-it-yourselfer, or a science buff, Apple II and Macintosh CAD products help you work out your ideas on screen and on paper — a blueprint for success. ❑

CYNTHIA E. FIELD IS THE AUTHOR OF PRESS ROOM, OUR MONTHLY COLUMN ON DESKTOP PUBLISHING. WRITE TO HER AT 60 BORDER DRIVE, WAKEFIELD, RI 02879. ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

PRODUCT INFORMATION

BeagleDraw 1.3
Beagle Bros, Inc.
6215 Ferris Square
Suite 100
San Diego, CA 92121
(619) 452-5500
$89.95
1MB GS

BluePrint 2.0, $295
1MB Mac Plus or higher
requires two disk drives
ContoursPro, $495
Mac Plus or higher
requires System 6.0
or later
2MB, hard-disk drive,
math coprocessor
recommended
MiniCad+ 3.0, $795
2MB Mac Plus or higher
requires hard-disk drive
System 6.0.2 or later
recommended
Graphsoft, Inc.
8370 Court Ave.
Suite 202
Ellicott City, MD 21043
(301) 461-9488

Cadapple 3.5 Revision 4
$99 entry level
$395 full version
128K Apple II
requires two disk drives
suports ImageWriter II
VersaCAD Drafter Macintosh,
$595
2MB Mac Plus or higher
VersaCAD Macintosh 3.01, $2395
free demo disk
2MB Mac Plus or higher
requires hard-disk drive
68881 coprocessor
recommended for SE
Prime Computer
100 Crosby Drive
Bedford, MA 02730-1480
(617) 275-1800

Car Builder
Optimum Resource
10 Station Place
Norfolk, CT 06058
(800) 327-1473
(203) 542-5553
$49.95
48K Apple II 5.25" disk
64K Apple II 3.5" disk

Claris CAD 2.0, $899
2MB Mac Plus or higher
hard-disk drive, System
6.0 or later recommended
Claris Graphics Translator 1.1,
$299
2MB Mac SE or II
requires hard-disk drive,
System 6.0 or later
MacDraw II 1.1, $199
1MB Mac
requires System 6.0
or later, hard-disk drive
or two 800K floppies
MacDraw Pro, $399
upgrade from MacDraw II
$99, purchases
before 12/1/90
free, purchases 12/1/90
to 6/24/91
1MB Mac Plus or higher
requires System 6.0.5
or later, 32-bit QuickDraw
for color
two 800K drives or hard-
disk drive recommended
Claris Corp.
5201 Patrick Henry Drive
P.O. Box 58168
Santa Clara, CA 95052
(408) 727-8227

Complete CADDRAW System 5.0, $129.95
site license $5
per computer
64K Apple II
48K version on flip side
includes **CADDRAW 5.0**,
Cookie Cutter 2.0
Symbol Maker/Editor,
Triple Dump
requires paddles, joystick,
mouse, KoalaPad,
VersaWriter, or
Gibson light pen
discoverCAD II, $250
128K Apple II
two disk drives,
mouse recommended
Hearlihy & Co.
714 West Columbia St.
P.O. Box 869
Springfield, OH
45501-9960
(800) 622-1000
(513) 324-5721

DesignCAD 2D/3D
DesignCAD, Inc.
1 American Way
Pryor, OK 74361
(918) 825-4848
$699.95
free demo disk
2MB Mac Plus or higher
requires hard-disk drive
math coprocessor
recommended

Design Your Own Home: Architecture
Design Your Own Home: Interiors
Design Your Own Home: Landscape
$69.95 each
64K Apple II
$89.95 each
1MB GS
$99.95 each
1MB Mac
Design Your Own Home Libraries,
$29.95 each
requires Architecture,
Interiors, or Landscape
Design Your Own Home: The Instant Decorator,
$49.95
64K Apple II
512K Mac
Design Your Own Railroad
Design Your Own Train
$49.95 each
64K Apple II
$59.95 each
1MB Mac
Run Your Own Train,
$34.95
64K Apple II
Train Library, $29.95
requires Railroad, Train,
or Run Your Own Train
Abracadata, Ltd.
P.O. Box 2440
Eugene, OR 97402
(503) 342-3030

Dreams 1.1, $599
1MB Mac Plus, SE
2MB Mac II
requires System 6.0.2
or later
hard-disk drive
recommended
MacDraft 2.1, $399
1MB Mac Plus, SE, II
requires System 6.0.2
or later
2MB and hard-disk
or external drive
recommended
Architectural Library,
$99
requires Dreams
or MacDraft
Innovative Data Design
2280 Bates Ave.
Suite A
Concord, CA 94520
(415) 680-6818

Generic CADD
Generic Software
11911 North Creek
Parkway South
Bothell, WA 98011
(206) 487-2233
$495
1MB Mac Plus or higher
requires hard-disk drive,
System 6.0.3 or later,
Sytem 6.0.5 and 32-bit
QuickDraw for color
2MB, math coprocessor
recommended

Generic CADD Student Edition
Addison-Wesley•
Benjamin/Cummings
Route 128
1 Jacob Way
Reading, MA 01867
(617) 944-3700
$54.94

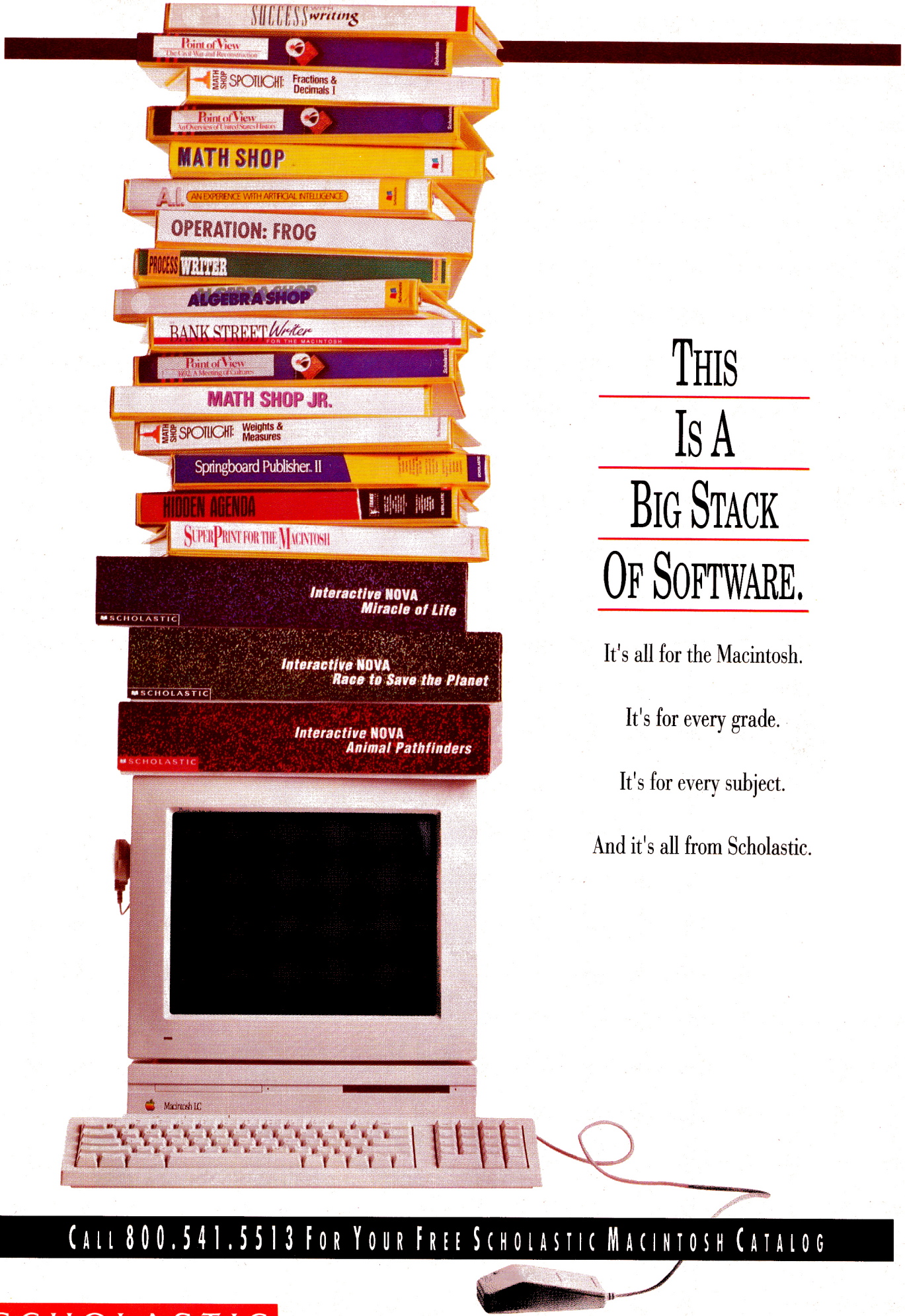
Glidepath 1.0
HRM Software/Queue
338 Commerce Drive
Fairfield, CT 06430
(203) 335-0908
$49.95
64K Apple II
requires 5.25" disk drive

PowerDraw 3.0
Engineered Software
615 Guilford
Jamestown Road
P.O. Box 18344
Greensboro, NC 27419
(919) 299-4843
$795
1MB Mac
requires hard-disk drive,
System 6.0.3 or later

PowerDraw Formatted Details
Intuitec Software
56 Goddard St.
North York, Ontario
Canada M3H 5E2
(416) 631-6603
$120 U.S. plus $10 shipping
Mac Plus or higher
requires PowerDraw 2.0
or higher

Super 3D 2.5
Silicon Beach Software
P.O. Box 261430
San Diego, CA 92126
(619) 695-6956
$495
1MB Mac Plus or higher
requires hard-disk drive
color requires 68881
math coprocessor

Virtus WalkThrough 1.0
Virtus Corp.
117 Edinburgh South
Suite 204
Cary, NC 27511
(919) 467-9700
$395
free demo disk
2MB Mac Plus or higher
4MB Mac II, hard-disk
drive recommended



THIS IS A BIG STACK OF SOFTWARE.

It's all for the Macintosh.

It's for every grade.

It's for every subject.

And it's all from Scholastic.

CALL 800.541.5513 FOR YOUR FREE SCHOLASTIC MACINTOSH CATALOG

SCHOLASTIC

Circle 41 on Reader Service Card.

For people with disabilities, equal access to computers can be the key to meeting the challenges of mainstream life.



BREAKING DOWN BARRIERS

By JOE KOHN * CONTRIBUTING EDITOR

For thousands of Americans with physical and developmental disabilities — children and adults alike — Apple's trademark slogan, "the power to be your best," is no empty statement. Thanks to IIs and Macs and an array of adaptive hardware and software products, Apple Computer has been a dominant force for more than a decade in the burgeoning movement to grant computer access to people with disabilities. Says Joan Tannehaus, a speech pathologist and founder of Technology for Language and Learning, a nonprofit organization that promotes the use of technology for people with disabilities, "I know how powerful a tool [Apples] are." Combined with specialized hardware and software, Apples "can help the nonverbal to speak, the learning disabled to master reading and writing, and the physically challenged to access a computer" — and to thereby participate in the mainstream of American life.

Fortunately for many people with disabilities, an introduction to computer use comes early. Currently, thousands of school districts around the country are mandated by federal and state law to provide special-education classes for children with disabilities, and these days virtually all those classes rely at least to some extent on Apple computers. In addition, the United States Department of Education's Office of Special Education states that under the Individuals with Disabilities Education Act, school districts must offer, at no cost to parents, all assistive-technology devices necessary to provide children with a free, appropriate education. Additional legislation, amendments enacted in 1990, further defines "assistive technology" as any piece of equipment that enables students with disabilities to increase, maintain, or improve functional capabilities. That amendment virtually ensures that Apple computers will see continued use in the special-needs classroom of tomorrow.

Additional federal legislation will help move special-needs computer hardware, software, and accessories from the exclusivity of the classroom and computer lab into the mainstream workplace. The landmark Americans with Disability Act, signed into law by President Bush in July 1990 and due to become effective in stages starting in 1992, is going to have a profound effect on people with disabilities and on society as a whole. In addition to banning discrimination against people with disabilities, the law requires all businesses with more than 15 employees to make "reasonable accommodations" to people with disabilities — and that includes the provision of specialized computer hardware and software to employees who need it. (For more information, contact the U.S. Department of Justice Civil Rights Division at 202-514-2000 or the Department of Education at 202-708-5366.) In just a few years, what was formerly the province of teachers,

Illustration * Chris Gall



rehabilitation professionals, vocational counselors, speech pathologists, and social workers will become a nationwide concern. Let's take a closer look at some of the products that will make this change possible and a few of the organizations that promote them.

EQUAL ACCESS

Computers, of course, depend heavily on user input for almost any kind of operation. Word processing, spreadsheet calculation, database management and recordkeeping, desktop publishing, drawing and painting, telecommunications, game play all require some nteraction — or at least some initial input — before your hardware and software working together can produce the result you're looking for. On standard computer systems, the two most common input devices are the keyboard and the mouse, but because they require a large degree of physical coordination, many people with disabilities are precluded from using them. Until a few years ago, that meant they were also precluded from using computers — but not anymore. Thanks to a pair of remarkable interfaces from Don Johnston Development Corporation — the **Adaptive Firmware Card G32e** for the Apple IIe and IIGS, and the **Ke:nx** box (pronounced *connects*) for the Macintosh — any of a number of alternative input devices, designed around particular physical strengths and limitations of mobility, vision, hearing, and speech, can be hooked up to your computer as substitutes for the keyboard and mouse.

The **Unicorn Expanded Keyboard Model II**, an 8-by-16-key touch-sensitive device, can help compensate for impaired fine-motor skills. (The **Model 510**, a smaller unit for those with a more limited range of mobility or more refined targeting skills, is also available for IIs and Macs.) You can program any area of the keyboard to represent any keystroke or any combination or series of keystrokes. For instance, if you're using software that asks yes/no questions, you can set up half the keyboard to indicate yes, the other half no. If you're using AppleWorks, you can set up a standard character layout, but with much larger keys, or you can designate certain single keys to represent various open-apple key combinations. In addition, the **Unicorn Users Group** has developed a series of preprogrammed setups for a number of popular commercial software products.

Prentke Romich's **HeadMaster** pointing system replaces the mouse. A lightweight headset sends infrared signals to a unit sitting atop the computer monitor; the receiving device translates changes in the user's head position into cursor movement on screen. Puffing lightly into a tube connected to the headset is the equivalent of pressing the mouse button.

Other input devices include Morse-code switches, which send "dots and dashes" to the AFC or Ke:nx, which in turn translates those taps into keyboard characters; sip-and-puff tubes that manage cursor movement and emulate the mouse button; head sticks and mouth sticks; the **TASH Mini Keyboard** for people with limited range of motion; sensor switches that are activated by controlled small-muscle movement; Sentient Systems' **EyeTyper 300**, which responds to eye movement; and Prentke Romich's **LightTalker**, another optical head pointer that responds to eye movement, but also incorporates speech generation for users with compatible **Echo** voice-synthesis cards (more on that below). The **TouchWindow** screen overlay (which plugs into the joystick port and doesn't require an interface) from Edmark lets you trace characters or line drawings on screen with your finger, or select menu options on screen by pressing them. The type of output you see on screen depends on the particular software you're using with the TouchWindow — a word processor versus a paint program, for instance. (Note that not all programs are TouchWindow compatible, though; HyperStudio is one product for the GS that's available in an optional compatible version.)

Voice recognition is still another input option, popular for home-control and telephone ordering systems as well as in special-needs settings, particularly with users who have limited arm and hand mobility. Recognition systems — plug-in cards or external units, depending on the model you choose — compare incoming sounds to patterns of speech, called *templates*, stored in memory.

With most systems, you create templates by recording various spoken letters, words, and commands as you "train" the unit to recognize your voice. (Even people with impaired speech can use voice-recognition technology as long as they pronounce words consistently.) Thereafter the system responds only to your voice; if an incoming sound matches a stored sound closely enough, the system "recognizes" it and delivers your command just like any other alternative input device.

Some models, such as Articulate Systems' **Voice Navigator II** for the Mac, let you create templates for any off-the-shelf software program because their vocabulary is "unlimited" — meaning that you can record any words you choose. Other units include only preselected words, such as operating-system or Applesoft commands, that you must merge with your own voice. Some systems recognize anyone's voice without any training, but the range of words such models recognize is severely limited.

IN THE MAINSTREAM

Taking a look at a catalogue of hardware from Don Johnston, Prentke Romich, or any of the other developers mentioned here is like getting a glimpse of the future of computing. But what's most remarkable is that many of these adaptive peripherals don't require special software — people with disabilities can use any off-the-shelf program, from AppleWorks to HyperCard.

How's that possible? For one thing, built into the AFC and Ke:nx boards are a number of customized *scripts* — macros that represent sequences of keystrokes for certain popular software packages. Organizations such as the Disabled Children's Computer Group (profiled below) offer still others. In addition, you can write your own scripts — such as one that displays all pull-down menu commands at the bottom of the screen, perhaps — and

save them to disk, designating different input methods for the same software, tailored to individual needs.

A slower input method is the devices' built-in "scan mode," in which all letters of the alphabet and numbers are displayed sequentially on screen while the off-the-shelf application program is running. To type, the user just hits the switch device as each character he or she needs appears on screen. It's tedious work, but it offers computer access to people with even the severest disabilities.

Alternatively, Apple Computer includes certain *Universal Access* tools in its Mac and new GS operating systems: **CloseView**, a utility that magnifies the screen for users with impaired vision; **MouseKeys**, a utility that sets up the keyboard for cursor movement, so that you can hit the upper left portion, for instance, and the cursor will follow; and **Sticky Keys**, a utility that "holds down" the first key you strike so that you can access multiple-keystroke commands without having to actually depress more than one key at a time. An additional product, available from the Apple Programmers and Developers Association, is **Video Keyboard**, a new desk accessory for the GS that places a graphics representation of the keyboard on screen, letting users of alternative input devices choose characters by touching or pointing as their off-the-shelf application program is running.

ALLIANCE FOR TECHNOLOGY ACCESS SITES

ALABAMA
Birmingham Alliance for Technology Access Center
Birmingham Independent Living Center
3421 5th Ave. South
Birmingham, AL 35222
(205) 251-2223
(205) 251-0863

Technology Assistance for Special Consumers
2939 Johnson Road
Southwest
Huntsville, AL 35805
(205) 880-0671

ALASKA
Alaska Center for Adaptive Technology
Sheffield Hotel
104 Katlian
P.O. Box 6069
Sitka, AK 99835
(907) 747-6960

ARKANSAS
Technology Resource Center
c/o Arkansas Easter Seal Society
2801 Lee Ave.
Little Rock, AR 72205
(501) 663-8331

CALIFORNIA
Team of Advocates for Special Kids
100 West Cerritos
Anaheim, CA 92805
(714) 533-TASK

Disabled Children's Computer Group
2095 Rose St., 1st Floor
Berkeley, CA 94709
P.O. Box 27741
Honolulu, HI 96827-0741
(808) 955-4464

ILLINOIS
Technical Aids and Assistance for the Disabled Center
1950 West Roosevelt
Chicago, IL 60608
(312) 421-3373

Northern Illinois Center for Adaptive Technology
3615 Louisiana Road
Rockford, IL 61108
(815) 229-2163

IOWA
READI
P.O. Box 523
Marion, IA 52302
(319) 365-2683

KANSAS
Technology Resources for Special People
3023 Canterbury
Salina, KS 67401
(913) 827-0301

KENTUCKY
SpeciaLink
36 West 5th St.
Covington, KY 41011
(606) 491-2464

Bluegrass Technology Center for People with Disabilities
894 Georgetown St.
Lexington, KY 40511
(606) 255-9951

Disabled Citizens Computer Center
Louisville Free Public Library
4th and York Sts.
Louisville, KY 40203
(502) 561-8637

LOUISIANA
Center for Adaptive Technology and Educational Resources
1636 Toledano St.
Suite 311
New Orleans, LA 70115-4598
(504) 899-8375

MASSACHUSETTS
Massachusetts Special Technology Access Center
1/6 Mudge Way
Town Center
Bedford, MA 01730
(617) 275-2446

MICHIGAN
Living & Learning Resource Centre
Physically Impaired Association of Michigan
601 West Maple St.
Lansing, MI 48906
(517) 487-0883

MINNESOTA
PACER Center, Inc.
4826 Chicago Ave. South
Minneapolis, MN 55417-1055
(612) 827-2966
(voice or TDD)

MISSOURI
Computer Resource Center
St. Louis Easter Seal Society
5025 Northrup
St. Louis, MO 63110
(314) 776-1996

MONTANA
Parents, Let's Unite for Kids
1500 North 30th St.
Billings, MT 59101-0298
(406) 657-2055

NEVADA
Nevada Technology Center
2880 East Flamingo Road
Las Vegas, NV 89121
(702) 735-2922

NEW JERSEY
Computer Center for People with Disabilities
c/o Family Resource Associates, Inc.
35 Haddon Ave.
Shrewsbury, NJ 07702
(201) 747-5310

NEW YORK
Techspress
Resource Center for Independent Living
401 Columbia St.
Utica, NY 13502
(315) 797-4642
(voice or TDD)

NORTH CAROLINA
Carolina Computer Access Center
Metro School
700 East Second St.
Charlotte, NC 28202
(704) 342-3004

NORTH DAKOTA
Pathfinder Parent Training and Information Center
ATA Computer Resource Center
1600 2nd Ave. SW
Minot, ND 58701
(701) 852-9426
(701) 852-9436

OHIO
Communication Assistance Resource Service
2140 Arbor Blvd.
Dayton, OH 45439
(513) 294-8086

OKLAHOMA
Developmental Disabilities Resources, Inc.
4641 South Braden
Suite 113
Tulsa, OK 74135
(918) 664-5257

OREGON
Oregon Outback Technology Access Center
P.O. Box 2916
La Grande, OR 97850
(503) 963-2129

PENNSYLVANIA
Technology Resources for People with Disabilities
c/o Kencrest
Room 200
1 Plymouth Meeting Mall
Plymouth Meeting, PA 19462
(215) 825-9298

TENNESSEE
West Tennessee Special Technology Resource Center
Lambuth College
Carney Johnston Hall
401 Maple St.
P.O. Box 3683
Jackson, TN 38303
(901) 424-9089
(901) 424-9090

East Tennessee Special Technology Access Center
5719 Kingston Pike
Knoxville, TN 37919
(615) 584-4465

Technology Access Center
Fountain Square
Suite 126
2222 Metro Center Blvd.
Nashville, TN 37228
(615) 248-6733

TEXAS
SHIP
University United Methodist Church
5084 DeZavala Road
San Antonio, TX 78249
(512) 696-1033

UTAH
Computer Center for Citizens with Disabilities
401 12th Ave.
Suite 114
Salt Lake City, UT 84103
(801) 321-5770

WASHINGTON
Seattle Technology Alliance for Resources and Training
257 100th Ave. NE
Bellevue, WA 98004
(206) 637-9848

WEST VIRGINIA
Project G.L.U.E.
c/o Children's Therapy Center
2345 Chesterfield Ave.
Charleston, WV 25304
(304) 342-5601



As noted above, Prentke Romich's LightTalker, an optical head pointer that responds to eye movement, also includes a speech-generation module for users with Echo cards. That means that any 8-bit application can become a "talking" program, translating keyboard, modem, or alternative input into synthesized speech; your machine repeats all keyboard input aloud. On the Mac, you can set up similar verbal feedback from the machine's own synthesis chip via a software product called **OutSpoken** from Berkeley Systems.

SPECIAL NEEDS

Although adaptive hardware devices let people with disabilities use any software, several companies excel in producing high-quality education- and productivity-oriented software tailored for people with special needs. Among these programs are a number of talking word processors, database managers, spreadsheets, telecommunications modules, learning packages, and games.

Many specialized talking programs let you toggle speech on and off; the software may verbalize each keystroke and cursor movement as you type, or you may be able to tell it to read your screen, document, or file back to you letter by letter or word by word for proofreading purposes after you've finished typing. Talking software gives Apple users with impaired vision or speech all the advantages a computer can offer in handling business, school, social, and entertainment needs that might be difficult or impossible otherwise.

For the GS, for instance, there's **SpeakIt** from Byte Works, a stand-alone application that's part of the company's **Talking Tools** speech-generation programming tools; for the IIe are **AppleWorks Companion** (for "talking" AppleWorks) from Access Unlimited, and Scholastic Software's **Talking Text Writer**. For users with severely limited vision, a special IIe word processor called **BEX**, from Raised Dot Computing, not only reads its files aloud in conjunction with the Echo speech synthesizer, but also supports large-character printing on the ImageWriter II and can transcribe documents for hardcopy output on Braille printers.

As for educational programs, Laureate Learning Systems produces an entire line of software incorporating voice generation, the **Talking Picture** series, in versions for the IIe and the GS, directed toward linguistic development and language intervention. All titles in the Laureate Learning line are visually appealing and work with a variety of alternative input devices.

Orange Cherry Software offers the **Talking Schoolhouse** series of educational programs for the GS, including **Talking School Bus**, **Talking Dinosaurs**, and **Talking Money**. Although designed as mainstream preschool programs, these multisensory learning activities are ideal for people with cognitive disabilities who need to learn about time, money, the calendar, science concepts, and map reading.

Other similar early-education programs include Weekly Reader's **New Talking Stickybear Shapes** and **Opposites**; Davidson's **Talking Math & Me**; and The Learning Company's **Talking Reader Rabbit**, all for the GS. Peal Software markets a line of IIe talking software called **Exploratory Play**, for those whose disabilities are cognitive or visual. Peal titles work with the Echo speech synthesizer and with different alternative keyboards.

Edmark offers an entire line of special-needs educational and entertainment software, including the excellent **Edmark Reading Program** for the IIe, to work in conjunction with the company's TouchWindow screen. Note that a number of special-needs programs of various genres for IIs and Macs are also available as freeware and shareware from public-domain disk houses and local user groups, or on line from information services and bulletin-board systems. In addition, a number of the organizations profiled below offer catalogues of low-cost public-domain software they've collected or adapted for speech output.

REACHING OUT

Where can you go for additional information? Start with Apple Computer's **Worldwide Disability Solutions Group**, managed by Dr. Alan Brightman. His office helps promote the computer as a tool of liberation for the nearly 40 million Americans with disabilities. In addition, Brightman and former Apple employee Peter Green have published a remarkable book called ***Independence Day: Designing Computer Solutions for Individuals with Disabilities*** — a thorough overview of how computers operate and how they can be personalized for people with disabilities through the use of special hardware devices and software programs. The book includes a discussion of the latest technological advances, describes alternative methods people with disabilities can use to attain mastery over a computer, and provides a comprehensive resource guide. It's an excellent starting point for learning more about this innovative technology.

The Worldwide Disability Solutions Group has also accumulated a comprehensive database with lists of special-needs hardware and software products and other organizations that support computer users with disabilities. All that information has been compiled into a 400-page book, ***Apple Computer Resources in Special Education and Rehabilitation***, available through **DLM Teaching Resources**, describing more than 1000 products, publications, and groups that can help children and adults with disabilities to take advantage of the power of computing. The Worldwide Disability Solutions Group has also produced a two-disk Macintosh HyperCard stack, available at no charge, called ***Solutions***, with information on nearly 1400 computer-related resources designed to assist people with disabilities.

One of the greatest contributions made by the Worldwide Disability Solutions Group has been its active funding of and participation in the **Alliance for Technology Access**. Started in 1987 in Berkeley, California, by Jackie Brand, the mother of a child with disabilities, the ATA is committed to transforming the tools of technology into opening doors to education,

employment, and new levels of personal fulfillment for people with disabilities.

The Alliance for Technology Access is a nationwide network of more than 40 community-based computer labs and resource centers dedicated to promoting awareness, understanding, and implementation of assistive technology. Each ATA center is a nonprofit, autonomous organization modeled to some extent after the first ATA site, the **Disabled Children's Computer Group** of Berkeley, California, and stocked with the latest adaptive technology available.

The DCCG itself relies on more than 20 Apple computers, mostly IIes, IIcs, and IIGses. In one sense, the DCCG is a computer-resource lab for children and adults with disabilities. But it's also a demonstration center for new assistive technology; it's an Apple user group; it's an educational center that provides consultation to parents, children, teachers, and rehabilitation specialists; it's a software lending library; it's a center for family workshops; it's a beta-test site for new adaptive technology. A devoted staff and the group's dedication to promoting the latest technology for special-needs users have earned the DCCG the respect of rehabilitation professionals around the world.

Two other widely known organizations, the **Trace Research and Development Center** and **ABLEDATA**, have joined forces to disseminate information about appropriate high-technology products for use by people with disabilities. The Trace Center, part of the University of Wisconsin, publishes a 1000-page resource guide offering detailed descriptions of more than 15,000 products currently available. The resource guide is updated every two years, but to keep up with the pace of technological change, the Trace Center in conjunction with ABLEDATA also distributes the information on a Mac HyperCard CD-ROM disc called **HyperABLEDATA**, updated twice a year. Digitized photos of 1000 of the database's products are included, along with audio samples from 50 different speech synthesizers. You can search according to a number of different criteria; predesigned letters to manufacturers requesting additional information are also included and can be printed.

If you don't have a Macintosh with a CD-ROM drive, you can call ABLEDATA toll free, and ask the support personnel to conduct a search of the database according to whatever criteria you supply — a detailed listing of all Apple II hardware devices available for users who are visually impaired, for example. ABLEDATA provides an eight-page report by mail at no cost; for reports longer than eight pages, it charges a minimal fee.

Closing the Gap is still another publication covering the latest advances in high-tech computing for people with disabilities. Each bimonthly issue is packed with information, feature articles, program listings, advertisements, and tips. One issue per year is devoted to a comprehensive resource guide listing hundreds of recently released hardware products, software programs, and peripheral devices. The magazine also hosts an annual "Microcomputer Technology in Special Education and Rehabilitation" conference in Minneapolis (this year October 17 – 19). It's generally considered the most significant event of the year for people with disabilities, special educators, rehabilitation professionals, administrators, service providers, personnel managers, government officials, and the hardware and software vendors who create products for this special segment of the population.

Several organizations collect disks of public-domain software, update the programs, and add support for alternative switch devices and voice output. The **Center for Adapted Technology**, a division of the Colorado Easter Seal Society, sponsors a computer lab, provides vocational evaluations and consultation, and publishes a newsletter covering the uses of adaptive technology. Its public-domain catalogue lists more than 350 Apple II and IIGS disks.

Technology for Language and Learning, the nonprofit organization founded by speech pathologist Joan Tannehaus, is dedicated to advancing the use of

TECHNOLOGY RESOURCE CONSORTIUM

CALIFORNIA
CompuMentor
89 Stillman St.
San Francisco, CA 94107
(415) 512-7784

CONNECTICUT
David Teten
P.O. Box 1533
Yale Station
New Haven, CT
06520-1533
(203) 436-0968 x2

DISTRICT OF COLUMBIA
Public Interest
Computer Association
Washington Computer
Assistance Program
Damian Saccocio
666 Pennsylvania Ave. SE
Suite 303
Washington, DC 20003
(202) 775-1588

GEORGIA
Steven Arkin
123 Abercorn St.
Savannah, GA 31401
(912) 232-0475

ILLINOIS
Information Technology
Resource Center
Deborah Strauss
59 East Van Buren
Suite 2020
Chicago, IL 60605
(312) 939-8050

MARYLAND
Maryland CompuTeer
Barbara Sweeney
Governors Office
on Volunteerism
State Office Building
301 West Preston St.
Baltimore, MD 21201
(301) 974-3594

MASSACHUSETTS
Boston Computer Society
Nonprofit Assistance Program
Peter Miller
1 Kendall Square
Cambridge, MA 02139
(617) 252-0600

MONTANA
Desktop Assistance
Marshall Mayer
23 South Last
Chance Gulch
Helena, MT 59601
(406) 442-3101

NEW HAMPSHIRE
Information Technology
Assistance Program
L. Daniel York
P.O. Box 1195
Concord, NH 03302
(603) 266-4827

NEW YORK
CompuTutor
David Hannay
Computer Science
Department
Union College
Schenectady, NY
12308-2311
(518) 370-6530

Aaron Werman
(212) 982-1862

PENNSYLVANIA
Steven Hazzard
38 East Knight Ave.
Colingswood, NJ 08108
(215) 243-2860

CompuMentor
of Pittsburgh
Steven Shafer
209 London Town Drive
Pittsburgh, PA 15226
(412) 268-2527

WASHINGTON
CompuMentor of Seattle
Vic Scott
15 Central Way
Suite 195
Kirkland, WA 98033
(206) 827-8417



technology and computers with children and adults with special language and learning needs. The TTL public-domain software catalogue lists 180 disks in 30 categories, from programs that teach cause-and-effect relationships to applications dealing with health and nutrition. All programs either support voice synthesis or are compatible with switch devices.

If you work in a nonprofit organization or school that's trying to implement computer use for people with disabilities, a number of organizations offer free consultation. **CompuMentor**, a San Francisco-based nonprofit organization that matches volunteer computer consultants with other nonprofit groups needing answers to technological questions, has been so successful that it has spawned the **Technology Resource Consortium**, a growing group of similar nonprofit organizations providing free computer consultation throughout the country. Check the accompanying sidebar to see whether there's such an organization in your locale. If there isn't, you can contact CompuMentor to receive free assistance in starting a similar organization in your state.

Many people and organizations around the country have pooled their talents and vision to work together to enhance the lives of people with disabilities — and even more exciting developments are on the horizon. Whether you're the parent of a child with disability, a rehabilitation specialist, a personnel manager, a computer user with a physical disability, or a computer expert who would like to volunteer your skills to a worthy organization, there are plenty of places you can go for more information about this exciting use of computer technology. As John Sculley, Apple's chief executive officer, notes in the introduction to *Independence Day*, "[The book] envisions a world powerfully changed by the increased participation of people with disability, a world in which diversity is regarded as the mainstream, a world in which any individual can make a significant personal difference. For many individuals with disability, the personal computer is already helping to turn that belief into reality. But as *Independence Day* makes abundantly clear, a new reality is, today, available to everyone." ❑

CONTRIBUTING EDITOR JOE KOHN HOLDS A MASTER'S DEGREE IN SOCIAL WELFARE AND IS A COMPUTER CONSULTANT SPECIALIZING IN APPLE SYSTEMS. WRITE TO HIM AT 166 ALPINE STREET, SAN RAFAEL, CA 94901. ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

PRODUCT INFORMATION

ABLEDATA
181 East Cedar St.
Newington, CT 06111
(800) 344-5405

Adaptive Firmware Card
G32e, $520
Ke:nx, $780
Don Johnston
Developmental Equipment
1000 North Rand Road
Building 115
P.O. Box 639
Wauconda, IL 60084
(708) 526-2682
(800) 999-4660

Alliance for Technology Access National Office East Coast
217 Massachusetts Ave.
Lexington, MA 02173
(617) 863-9966
(617) 863-9932 (fax)

Alliance for Technology Access National Office West Coast
1307 Solano Ave.
Albany, CA 94706-1888
(415) 528-0747
(415) 528-0746 (fax)

AppleWorks Companion
Access Unlimited
3535 Briarpark Drive
Suite 102
Houston, TX 77042
(713) 461-0006
$49.95

BEX
Raised Dot Computing
408 South Baldwin
Madison, WI 53703
(608) 257-9595
$450

Center for Adaptive Technology
Colorado Easter Seal Society
5755 West Alameda
Lakewood, CO 80226
(303) 233-1666

Closing the Gap
P.O .Box 68
Henderson, MN 56044
(612) 248-3294
$26/year

DLM Teaching Resources
1 DLM Park
Allen, TX 75002
(214) 248-6300

Echo II, $129.95
Echo IIc, $179.95
Echo Headphones, $19.95
Street Electronics
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

Edmark Reading Program, $450
TouchWindow, $275
Edmark Corp.
P.O. Box 3903
Bellevue, WA
98009-3903
(800) 426-0856

Exploratory Play Series
Peal Software
P.O. Box 8188
Calabasas, CA 91372
(818) 883-7849
$150

EyeTyper 300
Sentient Systems
5001 Baum Blvd.
Pittsburgh, PA 15213
(412) 682-0144
$3495

HeadMaster, $1095
plus $150
keyboard emulation
LightTalker, $5000
Prentke Romich
1022 Heyl Road
Wooster, OH 44691
(216) 262-1984

New Talking Stickybear Opposites
New Talking Stickybear Shapes
Optimum Resource/
Weekly Reader Software
10 Station Place
Norfolk, CT 06058
(203) 542-5553
$49.95 each

OutSpoken
Berkeley Systems
1700 Shattuck Ave.
Berkeley, CA 94709
(415) 540-5537
$395

SpeakIt
Talking Tools
Byte Works Inc.
4700 Irving Blvd. NW
Suite 207
Albuquerque, NM 87114
(505) 898-8138
$60 both modules

Talking Dinosaurs
Talking Money
Talking School Bus
Orange Cherry Software
P.O. Box 390
Pound Ridge, NY 10576
(914) 764-4104
$49 each (consumer)
$59 each (educator)

Talking Math & Me
Davidson & Associates
3135 Kashiwa St.
Torrance, CA 90505
(213) 534-4070
$49.95

Talking Picture Series
Laureate
Learning Systems
110 East Spring St.
Winooski, VT 05404
(802) 655-4755
(800) 562-6801
$115 each (IIe)
$130 each (GS)
plus $2.50/item shipping and $5 handling

Talking Reader Rabbit
The Learning Company
6493 Kaiser Drive
Fremont, CA 94555
(800) 852-2255
$59.95

Talking TextWriter
Scholastic Software
P.O. Box 7501
2931 East McCarty St.
Jefferson City, MO 65101
(800) 541-5513
$149.95

TASH Mini Keyboard
TASH Inc.
70 Gibson Drive, Unit 12
Markham, ON L3R 4C2
Canada
(416) 475-2212
$375

Technology for Language and Learning
P.O. Box 327
East Rockaway, NY
11518-0327
(516) 625-4550

Trace Research and Development Center
1500 Highland Ave.
Madison, WI 53705
(608) 262-6966

Unicorn Expanded Keyboard Model II, $350
Unicorn Model 510 Keyboard, $250
Unicorn Engineering
5221 Central Ave.
Suite 205
Richmond, CA 94804
(415) 528-0670

Unicorn Users Group
6331 Fairmont Ave.
Suite 332
El Cerrito, CA 94530
(415) 528-0670

Video Keyboard
Apple Programmers & Developers Association
Apple Computer Inc.
20525 Mariani Ave.
M/S 33G
Cupertino, CA 95014
(800) 282-2732
$20 members only

Voice Navigator II
Articulate Systems
99 Erie St.
Cambridge, MA 02139
(617) 935-5656
$899.97

Worldwide Disability Solutions Group
Apple Computer Inc.
20525 Mariani Ave.
M/S 36SE
Cupertino, CA 95014
(408) 974-7910

PRICES SLASHED!

SUPER SOFTWARE CLEARANCE SALE

SAVE UP TO 60%

SUCCESS WITH APPLEWORKS

Ruth Witkin, AppleWorks in Action columnist, has created these templates exclusively for *inCider/A+*. Each volume of the popular Success with AppleWorks series delivers ten ready-to-use templates on one disk, plus a detailed documentation booklet. Fast, efficient and error-free!

- VOLUME I — Mail List, Checkbook, Price Quote, Loan, Quote Letter, Newsletter, Price/Volume, Budget, Sales Report, Expenses
- VOLUME II — Cash Flow, Breakeven, Net Worth, Menu, 3-Across Labels, Income, Car Loan, Rent or Buy, Cover Letter, Important Numbers
- VOLUME III — Car Costs, Retirement, Living Expenses, Credit Cards, Return-Address Labels, Handbook, Wine List, Taxes, Loan II, Travel Expenses
- VOLUME IV — Annual Interest Calculations, Retirement Budget Plan Business Statements, Business Startup Expenses, Résumé Layouts, Stock Portfolio, Job Search Employer Database, Shopping Lists, Résumé Cover Letters, Investment Payouts
- VOLUME V — Invitation, Expense Itemizer, Stock Portfolio, Newsletter, Club Membership, Memo Merge, Taxes89, Personal Documents, Mortgage, Retirement Budget

$29.97 each, now just $15!
All five for $99.97, now just $60!

** Volumes I - IV require AppleWorks version 2.0 or higher. Volume V requires AppleWorks version 2.1 or higher. AppleWorks is a registered trademark of Apple Computer, Inc., licensed to Claris Corporation.*

PUBLISH IT! YOURSELF

Enhance your Publish•It!2 desktop-publishing experience with this distinctive set of templates for use with Publish•It!2. Ten ready- to-use templates (plus complete documentation booklet) take the bother out of setting up formats for a variety of desktop-publishing projects. Business people, teachers, students, hobbyists, club members, and home users alike will benefit from using these trouble-free, hassle-free templates: Cassette Labels, Fold-Out Brochure, Newsletter, Business Forms, Certificate Maker, Index Card Designs, Disk Labels, Gift Tags, Reminders, To-Do Forms

$39.95, now just $16!

**Requires Publish•It!2 or higher. Publish It! is a product of Timeworks, Inc.*

INCIDER'S CLIP-ART COLLECTIONS

Borders! Fonts! Graphics!

Bring a professional look to newsletters, lesson plans, flyers, announcements, memos and personal communications! Each extensive four-volume set provides top-quality art spots for any project you assemble using The Print Shop, or other compatible desktop-publishing program.

IIc/IIe/IIgs Edition — $49.95, now just $20!
** Volume IV requires The Print Shop.*

IIgs Specific Edition — $69.95, now just $30!
** Requires The Print Shop IIgs.*

inCider's Clip-Art Collection I

VOLUME I — Holiday, Vacation and Travel VOLUME II — Animals and People VOLUME III — Educational Images VOLUME IV — Borders and Fonts.

inCider's Clip-Art Collection II

VOLUME I — Home and Business VOLUME II — Animals and People VOLUME III — Education and Sports VOLUME IV — Fonts and Borders

The Print Shop is a registered trademark of Broderbund Software.

FOR FAST SERVICE CALL TOLL-FREE 1-800-343-0728

YES! Give me a great deal on great software!

Please send me the following *inCider/A+* Special Products:

inCider's Clip-Art Collection I*
☐ IIc/IIe/IIgs Edition $20/set ☐ IIgs Specific Edition $30/set

inCider's Clip-Art Collection II*
☐ IIc/IIe/IIgs Edition $20/set ☐ IIgs Specific Edition $30/set

Publish It! Yourself*
☐ $16

Success With AppleWorks*
☐ All 5 Volumes $60/set
Volumes I-V $15/each ☐ Vol.I ☐ Vol. II ☐ Vol. III ☐ Vol. IV ☐ Vol. V

Name _____

Address _____

City/State/Zip _____

☐ Payment enclosed (payable to *inCider/A+*)

Charge my: ☐ MasterCard ☐ Visa ☐ American Express

Card # _____ Exp. Date _____

Signature _____

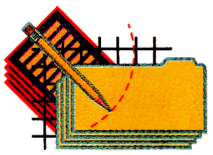
Canadian orders: add 7% GST. Foreign air mail: add $3.95.
Foreign orders must be paid in U.S. funds drawn on a U.S. bank

**See system requirements listed above.*

HIB1A

For credit card orders call toll-free 1-800-343-0728 (in NH 924-0100) or FAX your order to 1-603-924-9384

***inCider/A+* Special Products • 80 Elm Street • Peterborough, NH 03458**



APPLEWORKS IN ACTION

FAIR ESTIMATES 2

It's good business to let AppleWorks help decide what your customers should pay.

By RUTH K. WITKIN

PREPARING A PROJECT ESTIMATE that makes dollars as well as sense requires you to look carefully at the resources in your firm, calculate payroll costs of people assigned to the project, and allocate support and overhead costs properly. Last month (September 1991, p. 49) you began creating a project-cost spreadsheet that can do much of this work for you. (See the accompanying **Figure**.)

The sample company is a small engineering and design firm whose proposals to clients are based on the number of hours assigned to the client's project. Lookup tables in rows 32 through 46, columns A and B, and columns E and F contain the names and rates of engineers, designers, and drafters whose time can be billed directly to a project. From this technical resource pool, the project leader selects employees and assigns hours.

Formulas retrieve employee names and rates from the tables, calculate billable hours, then produce the overhead, marketing, administrative, accounting, and clerical costs based on hours spent by billable employees. The result is the estimated project cost.

That done, you and the formulas use an *iteration* technique to produce an estimate sent to the client. What makes iteration so special is that two formulas use each other's calculations over and over for their next calculation — essentially bouncing one off the other until they reach the proper result.

Load the spreadsheet file named **PROJECT**. The *Review/Add/Change* screen appears with the cursor in cell A1. Now pick up where you left off last month, referring to the highlighted areas in the **Figure** for formula locations.

FORMULA 9: Totals

Cell location: C24

Formula: @SUM(C23.C11)

Formula 9 adds the hours spent in the analysis phase of this project (C22 through C12) and enters the result in C24. By including the lines in C11 and C23, you can add more rows to this area later and AppleWorks will adjust the formula to add the new entries along with the old.

Copy Formula 9 to the other cells in row 24, where it can add the hours in the report, design, supervision, and checkout phases of the project, and produce the total number of billable hours, rates per hour, allocated costs, and total costs: With the cursor on C24, press Open apple-C (OA-C), and press Return twice. Move the cursor to D24, type a period, move the cursor to M24, and hit Return. Press OA-R to identify both cell references as relative. Press OA-K to do some of the calculations.

In copying Formula 9 to the right, you also copied its fixed format of commas with one decimal place. Now give the dollar cells a dollar format: Place the cursor on I24 and press OA-L. Type **B**, move the cursor to M24, and hit Return twice. Type **D2** (for *Dollars, 2* decimal places) and hit Return again.

FORMULA 10: Benefit per Hour

Cell location: D32

Formula: +C32*M30/100

Formula 10 multiplies the employee's hourly rate (C32) by the benefits rate per hour (M30), expressed as a percentage, and enters the result in D32. The benefit rate in M30 assumes a typical employer paying 35 percent over and above every salary dollar for employee benefits (paid time off, insurance, Social Security, disability, and so on).

Copy Formula 10 down its column: With the cursor on D32, press OA-C, press Return twice, move the cursor to D33, type a period, move the cursor to D46, and hit Return. Type **R** and press Return. Press OA-K to recalculate.

FORMULA 11: Total

Cell location: F32

Formula: +D32+C32

Formula 11 adds the rate per hour (C32) and benefit per hour (D32) to produce the total billable rate per hour in F32.

Now copy Formula 11 down its column: With the cursor on F32, press OA-C, press Return twice, move the cursor to F33, type a period, move the cursor to F46, and hit Return. Press OA-R, then OA-K. Here's where things get really interesting, as many of the formulas in the upper part of the spreadsheet come to life.

FORMULA 12: All Employees (General Overhead)

Cell location: M35

Formula: +M44+@COUNT(E32.E46)

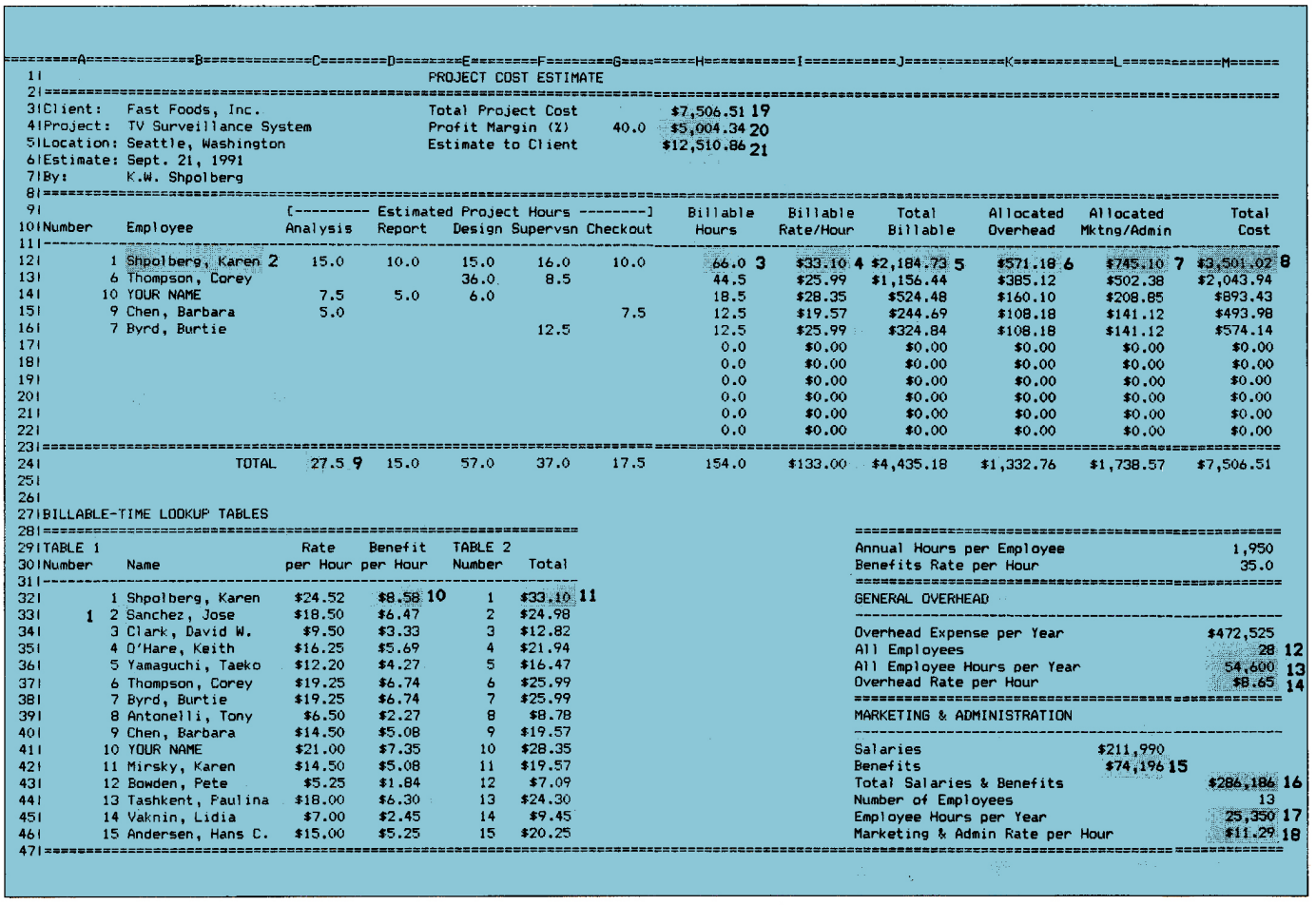
Formula 12 produces the total number of employees, which is used to calculate the general overhead rate in M37. The formula adds the number of marketing and administration employees (M44) to a count of employees in the billable-time lookup table (E32 through E46) and enters the result in M35.

If you expand the lookup table later, be sure to edit this formula to include the new rows.

FORMULA 13: All Employee Hours per Year (General Overhead)

Cell location: M36

Formula: +M35*M29



PROJECT COST ESTIMATE

Client:	Fast Foods, Inc.						Total Project Cost		$7,506.51	19			
Project:	TV Surveillance System						Profit Margin (%)	40.0	$5,004.34	20			
Location:	Seattle, Washington						Estimate to Client		$12,510.86	21			
Estimate:	Sept. 21, 1991												
By:	K.W. Shpolberg												

Number	Employee	Estimated Project Hours: Analysis	Report	Design	Supervsn	Checkout	Billable Hours	Billable Rate/Hour	Total Billable	Allocated Overhead	Allocated Mktng/Admin	Total Cost
1	Shpolberg, Karen	15.0	10.0	15.0	16.0	10.0	66.0	$33.10	$2,184.73	$571.18	$745.10	$3,501.02
6	Thompson, Corey			36.0	8.5		44.5	$25.99	$1,156.44	$385.12	$502.38	$2,043.94
10	YOUR NAME	7.5	5.0	6.0			18.5	$28.35	$524.48	$160.10	$208.85	$893.43
9	Chen, Barbara	5.0				7.5	12.5	$19.57	$244.69	$108.18	$141.12	$493.98
7	Byrd, Burtie				12.5		12.5	$25.99	$324.84	$108.18	$141.12	$574.14
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	TOTAL	27.5	15.0	57.0	37.0	17.5	154.0	$133.00	$4,435.18	$1,332.76	$1,738.57	$7,506.51

BILLABLE-TIME LOOKUP TABLES

TABLE 1 Number	Name	Rate per Hour	Benefit per Hour	TABLE 2 Number	Total
1	Shpolberg, Karen	$24.52	$8.58	1	$33.10
2	Sanchez, Jose	$18.50	$6.47	2	$24.98
3	Clark, David W.	$9.50	$3.33	3	$12.82
4	O'Hare, Keith	$16.25	$5.69	4	$21.94
5	Yamaguchi, Taeko	$12.20	$4.27	5	$16.47
6	Thompson, Corey	$19.25	$6.74	6	$25.99
7	Byrd, Burtie	$19.25	$6.74	7	$25.99
8	Antonelli, Tony	$6.50	$2.27	8	$8.78
9	Chen, Barbara	$14.50	$5.08	9	$19.57
10	YOUR NAME	$21.00	$7.35	10	$28.35
11	Mirsky, Karen	$14.50	$5.08	11	$19.57
12	Bowden, Pete	$5.25	$1.84	12	$7.09
13	Tashkent, Paulina	$18.00	$6.30	13	$24.30
14	Vaknin, Lidia	$7.00	$2.45	14	$9.45
15	Andersen, Hans C.	$15.00	$5.25	15	$20.25

Annual Hours per Employee		1,950
Benefits Rate per Hour		35.0
GENERAL OVERHEAD		
Overhead Expense per Year		$472,525
All Employees		28 12
All Employee Hours per Year		54,600 13
Overhead Rate per Hour		$8.65 14
MARKETING & ADMINISTRATION		
Salaries	$211,990	
Benefits	$74,196 15	
Total Salaries & Benefits		$286,186 16
Number of Employees		13
Employee Hours per Year		25,350 17
Marketing & Admin Rate per Hour		$11.29 18

Figure. Project-cost-estimate spreadsheet with sample entries. Highlighted areas are formula locations.

Formula 13 multiplies the number of employees (M35) by annual hours per employee (M29) and enters the total number of annual hours in M36.

Employees in our fictional engineering and design company work seven and a half hours per day, five days per week, for a total of 1950 hours per year. If your employees work a different schedule, you can change the number in M29 later. For an eight-hour day, five days per week, enter 2080; for a seven-hour day, five days per week, enter 1820.

FORMULA 14: Overhead Rate per Hour

Cell location: M37

Formula: +M34/M36

Formula 14 divides overhead expense per year (M34) by the total annual hours of all employees (M36) and enters the general overhead rate per hour in M37.

FORMULA 15: Benefits (M & A)

Cell location: L42

Formula: +L41*M30/100

Formula 15 multiplies marketing and administration salaries (L41) by the benefits rate (M30), expressed as a percentage, and enters the amount of support staff benefits in L42.

FORMULA 16: Total Salaries & Benefits (M & A)

Cell location: M43

Formula: +L42+L41

Formula 16 adds marketing and administration salaries (L42) and benefits (L42), and enters the result in M43.

FORMULA 17: Employee Hours per Year (M & A)

Cell location: M45

Formula: +M44*M29

Formula 17 multiplies the number of marketing and administration employees (M44) by annual hours per employee (M29) to produce the total number of annual marketing and administration hours in M45.

FORMULA 18: Rate Per Hour (M & A)

Cell location: M46

Formula: +M43/M45

Formula 18 divides marketing and administration salaries and benefits (M43) by employee hours per year (M45) to produce the marketing and administration rate per hour in M46.

Press OA-K to calculate the formulas. Your results should be the same as those shown in the accompanying **Figure**. Now enter the last three formulas.

FORMULA 19: Total Project Cost

Cell location: H3

Formula: +M24

Formula 19 copies the amount generated in the total-cost cell (M24) to the total project cost cell (H3). This number is the basis for the estimate to the client.

FORMULA 20: Profit Margin

Cell location: H4

Formula: +H5*G4/100

Formula 20 multiplies the estimate amount (H5) by the percentage you enter in the profit-margin cell (G4), and enters the profit in H4. Cell H5 is empty, so Formula 20 enters a zero.

FORMULA 21: Estimate to Client

Cell location: H5

Formula: +H3+H4



MPD 5¼" DISK DRIVES FOR:

1 Year Warranty Parts & Labor
100% Compatible
Super Quiet
Cable Included

Apple II, II+, IIe Franklin Ace 1000 — $89.00
Apple IIc, IIc+, IIGS Apple IIe UniDisk Laser 128 — $99.00
Apple IIc+, IIGS Daisy Chain — $99.00

AMR 3½" Disk Drive For Apple IIc+ & IIGS — $199.00

PRO TERM $78.50

Memory Chips ..... Call

MPD 4 Meg GS Card
0 Meg $59.00
1 Meg $114.00
2 Meg $169.00
4 Meg $279.00

SUPER EXPANDER
IIe 0K to 1 Meg ..... from $52.50
IIc 0K to 1 Meg ..... from $65.50

GS MOUSE $59.00

SWITCH BOXES
DIN 8 A/B $24.95
DIN 8 A/B/C/D $29.95
DB 25 A/B $24.95
DB 25 A/B/C/D $34.95
Parallel A/B $24.95
Parallel A/B/C/D $34.95

Extended 80 Column Card With 64K for Apple IIe
100% Appleworks Compatible
5 Year Warranty — $38.95

SUPER SERIAL CARD
100% Apple Compatible
5 Year Warranty $48.95

Graphics Printer Card w/Cable For Apple II+ & IIe
5 Year Warranty — Parallel $44.95

DISKETTE STORAGE W/Lock
5¼ Holds 70 Disks $6.95
5¼ Holds 100 Disks $8.95
5¼ Holds 120 Disks $10.95
3½ Holds 100 Disks $8.95

II+ OWNERS
16K Card $34.95
128K Card $64.95
80 Column Card $48.95
Plus Works $49.00
5 Year Warranty

Prices subject to change without notice.

UNIVERSAL DISK CONTROLLER
Run 800K Disk Drives on your II+ and IIe
$64.95

800K DISK DRIVE 3½
for II+, IIe, MAC, LASER 128
$179.00

Disk Controller Card For Apple II, II+ & IIe 5 Year Warranty — $34.95

CPM Card $34.95
IIe Numeric Keypad $34.95
II+ & IIe RF Modulator $15.95

Cooling Fan for Apple II+ & IIe With Surge Surpressor $26.95

Cooling Fan For Apple IIGS — $19.95 — No Noise Interference

ACCESSORIES
Mouse Pad $4.95
Disk Notcher $4.50
Disk Clean 5 ¼ $4.00
Disk Clean 3½ $4.00
Mouse Pocket $4.95
Amber Monitor $99.00

Replacement IIe Keyboard $55.00

7 Amp. Pwr. Supply II, II+ & IIe $49.00

Joystick for Apple IIe, IIc, IIc+ & IIGS
With Fire Button
Same as Mach III — $24.95

Cables From $9.95
IIe to Modem
IIe to IMG I
IIe to IMG II
IIc to Modem
IIc to IMG II
Others
Talk & Data Kits
SCSI Cables

GS Power Supply 7 Amp.
$69.00

We Ship 2nd Day Air Continental US Only

VISA & MASTERCARD — NO EXTRA CHARGE DEALER PRICING
Shipping Most Items $6.00 / Drives $8.00 / C.O.D. + $4.00

MEMORY PLUS DISTRIBUTORS, INC.
505 South 48th Street, Suite #104
Tempe, Arizona 85281
(602) 820-8819
FAX# (602) 968-3211
Serving Apple Users Since 1983

We carry only the Highest Quality products for your Apple. That's why we are the LARGEST and the BEST!

9 a.m. to 4 p.m. M.S.T. Mon - Fri.
University & School P.O. Accepted
20% Restocking charge on returned items

We Ship 2nd Day Air Continental US Only

Circle 248 on Reader Service Card.

APPLEWORKS IN ACTION

Formula 21 adds the total project cost (H3) and profit (H4) and enters the estimate in H5. For the moment, the value in H5 is just the value in H3, because H4 is zero. Press OA-K. Calculation takes place, but look at the result: The amount in H4, *$3,002.61*, is hardly 40 percent of *$10,509.12*, the amount in H5. What happened?

Let's analyze this situation. Formula 20 in H4 calculates a profit of 40 percent of the estimate, but we don't know the estimate amount. Formula 21 in H5 calculates an estimate that includes 40 percent profit, but we don't know the profit amount. It's a case of the chicken and the egg — the estimate depends on the profit and the profit depends on the estimate.

You can solve this dilemma by *iterating* the formulas. Iteration tells one formula to work with the calculations of another formula that's responding to the first formula's calculations. It's a merry-go-round where each formula uses the result produced by the other formula to perform its next calculation.

Press OA-K again and watch Formulas 20 and 21 interact. Press OA-K 16 more times to iterate the formulas. With each OA-K, the formulas get closer and closer to a proper answer. At the 16th OA-K, the numbers stop changing, which signals that the final answer has been reached. The profit is now *$5,004.34* (based on a 40-percent profit margin) and the estimate is *$12,510.86*. Well done!

After all this work, you wouldn't want anything to happen to your precious formulas, so protect them from accidental alteration: Place the cursor on H3 and press OA-L. Type **B**, move the cursor to H5, and hit Return. Type **PN** (for *Protection Nothing*).

In the same way, protect the formulas in B12 through B22, H12 through M22, C24 through M24, A32 through A46, D32 through F46, M35 through M37, L42, M43, and M45 through M46.

PRINTING THE SPREADSHEET

This spreadsheet is 148 characters wide and prints on two sheets of paper at 12 characters per inch. Press OA-O to bring up the *Printer Options* screen. Type **CI** (for *Chars per Inch*) and press Return. Type **12** and hit Return again. Press OA-S to store

this final version on disk and return the spreadsheet to the screen.

Now turn on your printer and make a hardcopy of your spreadsheet: Leaving the cursor where it is, press OA-P to bring up the *Print* screen, and hit Return to confirm *All*.

Press Return to select the printer (or type a printer number, then Return), type today's date (or, if your computer has a clock, type @ to have AppleWorks enter the date for you), and hit Return twice. The printer whirs away, producing the spreadsheet.

A FEW FINAL WORDS

Expanding this spreadsheet to suit your own operation is simple. You can insert more rows in both the project-hours and lookup-table sections. With the cursor on a row containing formulas and formats, press OA-C and choose *To clipboard* and *Rows*; then copy to the spreadsheet by highlighting *From clipboard* and *Formulas and values*.

This method of preparing a cost estimate for our hypothetical engineering and design company can be adapted easily to any other service operation, such as accounting, legal, and architectural firms whose charges are based on time. If you have many job classifications, consider using job titles and average rates in the lookup tables instead of specific employee names and rates.

By the way, if you missed "Fair Estimates 1" (September 1991, p. 49) and you'd like a copy, contact the *inCider/A+* editorial department at 80 Elm Street, Peterborough, NH 03458, (603) 924-0100, for a reprint.

Next month you'll use the word processor to create a fanciful marketing brochure for a small business that sells miniature antique cars. ❑

CONTRIBUTING EDITOR RUTH K. WITKIN IS THE CREATOR OF THE *SUCCESS WITH APPLEWORKS* TEMPLATE/HANDBOOK SERIES (*INCIDER/A+*, IDG COMMUNICATIONS/PETERBOROUGH) AND *RUTH WITKIN'S BEST NEW APPLEWORKS TEMPLATES* (QUALITY COMPUTERS). SHE'S ALSO THE AUTHOR OF *THE BEST BOOK OF APPLEWORKS* (MACMILLAN PUBLISHING COMPANY) AND *PERSONAL MONEY MANAGEMENT WITH APPLEWORKS* (JOHN WILEY & SONS). WRITE TO HER AT 5 PATRICIA STREET, PLAINVIEW, NY 11803. ENCLOSE A STAMPED, SELF-ADDRESSED ENVELOPE IF YOU'D LIKE A REPLY.

LOWEST PRICES ANYWHERE!

BEST SERVICE ! NO HIDDEN COSTS!

UNIV & SCHOOL P.O.'S WELCOME!

APPLE IIGS UPGRADES

4 MEGabyte IIGS RAM board.
Fully DMA Compatible .....w/1 MEG $99
Expands ROM 01 & ROM 3 IIgs ...w/2 MEG $149
Fall Special .....**w/4 MEG** $229
AEGS-RAM+ 6 MEG RAM board .w/1 MEG $189
256K RAM SET (8pc) Lifetime Wty $18
256K RAM 3 Set Special (24pc) $49
1 MEG RAM Set (8pc) 5 Yr Wty $55
IIGS Serial/Parallel Converter $59
IIGS replacement Power Supply $75
SoundSystem 2 New 2-Way Amplified Speaker Pair. Put the S in your IIGS $89

IIGS 105 MEG PRO-DRIVE

The fastest Quantum HardDrive (10ms). Complete w/Apple Hi-Speed SCSI Card. BONUS 25 Megabytes of the Best IIGS Public-Domain & Shareware Programs.
PLUG AND PLAY READY! $699

IIe/IIc MEGABYTE RAM

Licensed by Applied Engineering. A 100% replacement for Extended 80 card. Expands Appleworks desktop to 998K and allows instant switching between modules.
Above **w/256K** $89
Above **w/512K** .....**$109**.....**w/1 Meg** $149
Super Expander C Expands IIc to 1152K, Appleworks desktop to 1052K, & allows instant module switching **w/256K** $99
Above **w/512K** .....**$119**.....**w/1 Meg** $159

QUIET COOLING FANS

SuperFan II for II+/IIe. Kensington Style w/surge protect & twin rear AC outlets..... $27
Super Cooler GS for your IIgs. No audio line interference. Internal Mount..... $24

PRO-KEYPAD for IIe/IIc

Numberic data entry made simple. Includes mathematic, decimal & RETURN keys.
PRO KEYPAD for U.S. & European IIe..... $34
PRO KEYPAD for U.S. & European IIc..... $39

APPLE II Plus OWNERS

Run Appleworks on your II+ or Franklin Ace!
NEW Plusworks III will configure any version of Appleworks to run on your computer. One time configure package. Not a pre-boot.
A.W. 1.0-2.1 req. 64K, 80 columns, shift key mod.
A.W. 3.0 req. 128K, 80 columns, shift key mod.
Plusworks III w/complete docs $39
16K RAM BD. Expands II+ from 48K to 64K.. $34
128K RAM BD. Legend/Titan Compatible... $64
DOS/ProDOS Emulator for above 128K BD.. $24
80 Column II+ Board Videx compatible..... $48
Shift Key Modification $7
Lower Case Adapter. Rev. 7 & up $12

FALL SPECIALS

PBC EXTENDED 80 COLUMN CARD for Apple IIe. Expands IIe to 128K (Appleworks desktop to 56K). Super sharp 80 column display, soft switch select 40/80 columns, & Double Hi-res graphics, all built-in! $35
PBC 256K/80 COLUMN BORD IIe. All above features, plus expands your Appleworks 3.0 desktop to 137K .....**INTRO** $79
Super Serial Board 100% replacement for Apple Super Serial Card, this versatile RS232 board can be used for all modems **and serial printers. For II+/IIe/IIgs**..... $48
SSB to Imagewriter I cable 10' $11
SSB to Imagewriter II cable 10' $11
SSB to Modem (Standard RS232) 10' $11

MORE SUPER SPECIALS!

Graphic Parallel Board w/6ft cable. Text & graphic screen prints. Versatile graphics including inverse/normal, enhanced, 90 degree rotate & double size print. II+/e/gs.. $44
Parallel Printer Board w/cable. Text print only. Used where graphics is not required.. $35
Z80 CP/M Board Opens the CP/M world for II+/e/gs. Microsoft & Turbo Pscal Comp $34
Joystick III Similar to the Hayes Mach III, with large fire button on stick $24
6 AMP Power Supply. Drop in replacement for II+/IIe supply. Double the amp power!... $49
TV Modulator Connects your Apple II+/IIe to any color or black/white TV..... $15
Serial/Parallel Converter. Connects your IIc to any parallel printer $49
AE Transwarp 3.6Mhz accelerator. II+/e... $99
ZIPCHIP 8Mhz by Zip Tech. IIe/IIc $159

DISK DRIVES!

Disk Drive H/H for Apple II+/IIe..... $119
Disk Drive H/H for Apple IIc/IIc+IIgs $119
Disk Drive H/H Dsy Chainable IIc+/IIgs..... $139
Disk Controller BD 5.25" II+/IIe/IIgs..... $34
AMR 3.5" Drive $194
A.E. 3.5" Drive $199
Disk Controller BD 3.5" II+/IIe $49
AE VULCAN HARD DRIVES ..... Call
WD40MEG W/H.S. SCSI CARD..... $499

GAMEPORT SWITCHBOX

Switch between mouse & joystick or any two gameport peripherals. Free master cable... $29

COPY II PLUS

The ultimate copy program. For 5.25"-3.5"-Hard drives.
8.4 w/5¼ diskette..... $15

SWITCHBOXES!

Connect 2/4 Computers to One Printer!
Parallel (A/B) 2-Way $25
Parallel (A/B/C/D) 4 Way $35
Serial (A/B) 2 Way $25
Serial (A/B/C/D) 4 Way $35
Mini-Din 8 w/Master Cbl (A/B) 2-Way $35
Mini-Din 8 w/Master Cbl (A/B/C/D) $45

We carry a full line of cables for the Apple II and Mac serieis!..... Call!

5 YEAR NO HASSLE WARRANTY ON ALL PC BOARDS!
CALL or WRITE FOR OUR COMPLETE PRICE LIST!
ADD $4 SHIP-C.O.D. OKAY-VISA/MC NO EXTRA FEE!

PRICE BUSTERS (619) 589-0081
4233 Spring St., Ste. 402, La Mesa, CA 92041
Monday-Friday 10 a.m.-5 p.m. Pacific Time

Circle 105 on Reader Service Card.

COVER-UPS

Practicality meets creativity when you design customized disk jackets.

By CYNTHIA E. FIELD, Ph.D.

WHETHER YOU PREFER THE COMPACT Apple IIc, a IIGS with all the trimmings, or a slick new Macintosh, there's something you have in common with computer users everywhere: No doubt you have stacks of disks, packed with your favorite programs and important data files.

Although labels can help you manage the chaos, this month's project — color-coded jackets for 5.25- and 3.5-inch disks — is even more effective. Designing your own jackets means that you can not only protect your disks, but that you can personalize them as well with your name, your company's or school's name, or a logo.

Let's take a look at some samples created by Midge Frazel, a computer-resource consultant from Bridgewater, Massachusetts. (See **Figure 1**.) Her homemade disk jackets (adapted from a template I created as part of a shareware disk distributed by public-domain libraries such as **Big Red Computer Club**) typically display important program commands — the ones all of us, students and teachers alike, so often forget. Frazel has created color-coded disk jackets for, among other programs, **The Children's Writing & Publishing Center**. Now kids in the school's computer lab can recognize readily the program disk, the picture disk, or the "save" disk.

Frazel, who also develops classroom materials with Power Industries' **Delta Drawing Today**, created a handsome, laminated disk jacket sporting Delta commands. A keycap illustration accompanies each command word. Frazel made the graphics from a keycaps font provided by **Softdisk GS**, the disk-based monthly magazine.

When Frazel wrote recently to request a 3.5-inch disk-jacket template, we gave the project a whirl. Although we used **Publish It! 4** to make both the 3.5- and 5.25-inch templates, they're so simple you could use virtually any desktop-publishing, drawing, or painting program. If you're a Mac fan, see the accompanying sidebar, "Ten Steps Cover It," for tips on designing 3.5-inch disk jackets with that system.

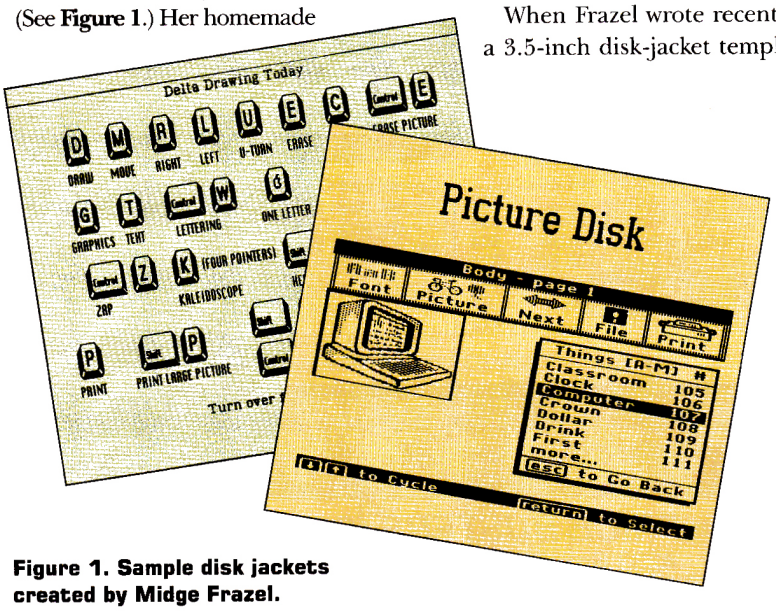


Figure 1. Sample disk jackets created by Midge Frazel.

ORGANIZATION MADE EASY

Creating a 5.25-inch disk jacket is easier than you think. Start up Publish It! 4, begin a *New File* (*File* menu), name it **Jacket.5.25**, and work in *Size to Fit* mode (Open apple-4, or OA-4). Select the text tool and "rubber-band" a text frame of any size. (Hold down the mouse button and drag.) Press OA-M and edit the frame's specifications so that they match the body-text dimensions in **Table 1**. Click on the *Locked* and *Frame Borders* radio buttons in the *Show Specifications* dialog box.

Create two more text frames (the *Left Tab* and *Right Tab* on the disk jacket) and make them match **Table 1**'s specifications. Remember that you can also open a *Show Specifications* dialog box by pulling down the *Objects* menu or — thanks to a convenient new Publish It! 4 feature — by double-clicking on the object itself.

The fourth and last object in our template

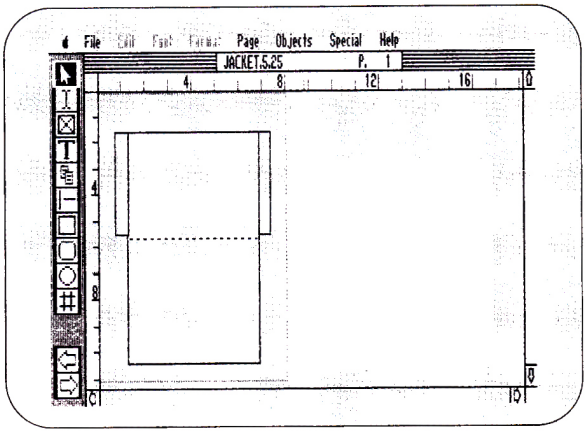


Figure 2. Screen dump showing 5.25-inch disk sleeve.

is a dashed line that represents a fold you make when you assemble the jacket later. Select the line tool, draw a line of any size, and edit its specs to match those in **Table 1**. Make sure the line's selected. If it doesn't show selection handles, click on the line with the pointer. You may have to switch to *Show Double Size* mode (OA-2) to select the line.

Pull down the *Objects* menu, select *Set Line Weight* and choose the narrowest one. Pull down the menu again, select *Set Pen Pattern*, and choose the first pattern in the second row. The pattern, a group of vertical stripes, makes a dashed line when you "slice off" a portion with the narrow line weight you've chosen. The completed disk jacket layout should look like the screen dump in **Figure 2**. Now save the file as a template. Use Publish It! 4's new *Format Disk* capability (*File* menu) if you need to make a data disk.

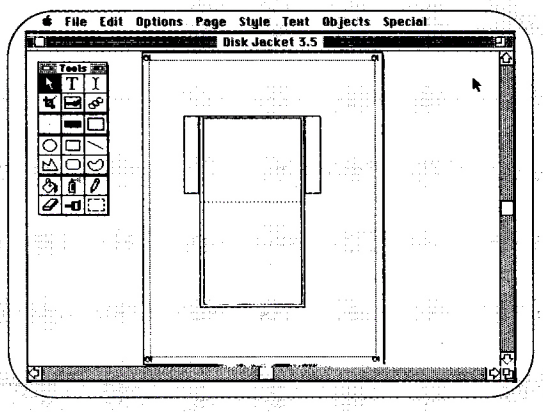
Now comes the fun part — get your creativity flowing and think about the kinds of text and graphics you'd like to include on the jacket. Because the body of the jacket is already a text frame, all you have to do is insert the I-beam into the area, choose a font, and begin typing. Switch to *Show Full Size* mode (OA-1) to do so.

Embellishing your work with assorted type styles, sizes, and justification is easy: Use the options listed under the *Font* and *Format* menus. **Figure 3** shows a disk sleeve we created to help new users remember those handy Publish It! quick-key commands. If you'd like to add clip art such as the *Ex Discis* graphics image — a public-domain **Print Shop** illustration that appears in our design — rubber-band a graphics frame and choose the appropriate import option listed under Publish It! 4's *File* menu.

Graphics know-how is just one skill that helps make Midge Frazel's desktop-publishing talents shine. Among other things, she incorporates program title screens (and command screens) into her floppy-disk-jacket layouts. Here's how:

Frazel starts up the program for which she wants to create a disk jacket — The Children's Writing & Publishing Center, for example. When the program's title screen appears, she presses the **Fingerprint GSi** touchpad to take a snapshot of the screen. Instead of "dumping" the picture to her printer, she uses Fingerprint software to save the illustration in

TEN STEPS COVER IT



Follow these Publish It! Easy steps to create 3.5-inch jackets like the one at right for your Mac disks:

1. Start up the program and select Page Setup (File menu). Choose US Letter and Portrait orientation. Click on the Tall Adjusted check box.

2. With the rectangle tool, rubber-band a Body rectangle, press Command-M, and make the object's specs match those provided in the **Table** below.

3. Click on the rectangle tool and repeat Step 2 to draw the Left Tab rectangle.

4. Now repeat Step 3 for the Right Tab rectangle.

5. Click on the line tool and draw a line of any size. Press Command-M and make the line conform to the **Table**'s specifications.

6. With the line selected (click on it with the pointer tool if necessary), pull down the Objects menu and choose Characteristics.

7. Select Pen Size and choose Thin Line. Then select Pen Pattern and choose the eighth pattern in the palette's top row.

8. Select the text tool, rubber-band a text frame, press Command-M, and make the object match the **Table**'s specifications. Your blank disk-jacket layout should look like the accompanying **Figure** above.

9. Choose the text-insertion tool, click on the insertion point in the text frame, and type whatever you'd like. Experiment with typefaces, sizes, and styles. Add original graphics or canned clip art. (Refer to the Publish It! Easy manual for additional information.)

10. Save, print (use Best printing mode), make photocopies if desired, and cut out the jackets. Assemble them according to instructions provided in the accompanying Press Room column.

Object	Left Start	Top Start	Width	Height
RECTANGLES				
Body	2.00	2.25	3.75	6.75
Left Tab	1.47	2.25	0.54	2.75
Right Tab	5.74	2.25	0.56	2.75
DASHED LINE	2.00	5.25	3.75	0.00
TEXT FRAME	2.19	2.35	3.40	6.50

Table. Specifications for 3.5-inch disk jacket created with Publish It! Easy for the Macintosh (all dimensions in inches).

Object	Left Start	Top Start	Width	Height	Other Attributes
TEXT FRAMES					
Body	1.279	1.588	5.500	8.750	frame border and lock
Left Tab	0.756	1.588	0.500	3.875	frame border and lock
Right Tab	6.794	1.583	0.500	3.875	frame border and lock
DASHED LINE	1.255	5.608	5.500	n/a	narrow line weight 1st pen pattern in 2nd row lock

Table 1. Specifications for 5.25-inch disk jacket created with Publish It! 4 (all dimensions in inches).

Object	Left Start	Top Start	Width	Height	Other Attributes
TEXT FRAMES					
Body	2.000	2.250	3.750	6.750	frame border and lock
Left Tab	1.500	2.250	0.477	2.750	frame border and lock
Right Tab	5.775	2.250	0.475	2.750	frame border and lock
DASHED LINE	2.000	5.250	3.750	n/a	narrow line weight 1st pen pattern in 2nd row lock

Table 2. Specifications for 3.5-inch disk jacket created with Publish It! 4 (all dimensions in inches).

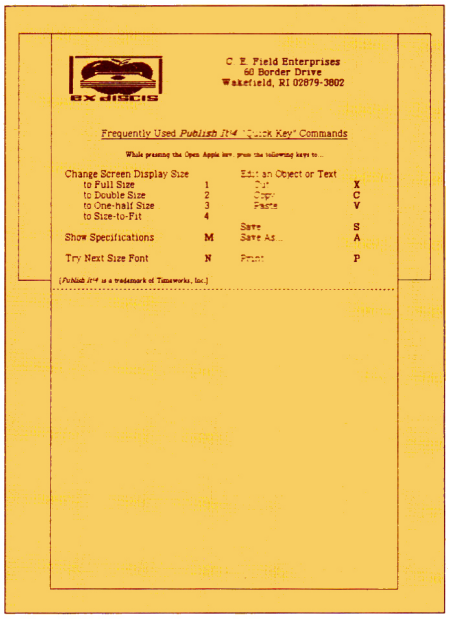


Figure 3. Sample 5.25-inch disk jacket created with Publish It! 4.

The Sensational Lasers

Apple IIe/IIc Compatible

$289

PRICES SLASHED



The Laser 128® features full Apple® II compatibility with an internal disk drive, serial, parallel, modem, and mouse ports. When you're ready to expand your system, there's an external drive port and expansion slot. The Laser 128 includes COPY II PLUS software! Take advantage of this exceptional value today..... **$289**

Super High Speed Option!

only **$365**

The LASER 128EX has all the features of the LASER 128, plus a triple speed processor and memory expansion to 1MB $365.00

LASER PC-4 the Notebook Computer that has received rave reviews. Transfer software included w/Serial and parallel cables.
MAC Version ..... New! $229.00
IBM Version ..... New! $209.00

DISK DRIVES
* 5.25 LASER/Apple 11c ..... $ 99.00
* 5.25 Apple 11e ..... $ 99.00
* 3.50 Apple 800K $139.00
* 5.25 LASER Daisy Chain $109.00
* 3.50 LASER Daisy Chain $179.00

Save Money by Buying a Complete Package!

THE STAR LASER 128 Computer with 12" Monochrome Monitor and the LASER 192E Printer $565.00

THE SUPERSTAR LASER 128 Computer with 14" RGB Color Monitor and the LASER 192E Printer $675.00

ACCESSORIES
* 12" Monochrome Monitor $109.00
* 14" RGB Color Monitor $229.00
* LASER 192E Printer - Epson New! $199.00
* LASER 192A Printer - Apple New! $219.00
* LASER 2424 Printer - 24Pin . New! $299.00
* LASER 128 RAM Card OK ..... $ 29.00
* Mouse ..... $ 49.00
* Joystick (3) Button ..... $ 29.00
* UDC Card ..... $ 49.00

USA MICRO YOUR DIRECT SOURCE FOR APPLE AND IBM COMPATIBLE COMPUTERS

2888 Bluff Street, Suite 257 • Boulder, CO. 80301
Add 3% Shipping • Colorado Residents Add 3% Tax

Your satisfaction is our guarantee!

Phone Orders: 1-800-654-5426
8-5 Mountain Time · No Surcharge on Visa or MasterCard Orders!
Customer Service 1-800-537-8596 · In Colorado (303) 938-9089
FAX Orders: 1-303-939-9839

Laser 128 is a registered trademark of Video Technology Computers, Inc. Apple, Apple IIe, Apple IIc and Imagewriter are registered trademarks of Apple Computer, Inc

Circle 297 on Reader Service Card.

double-hi-res format, compatible with all versions of Publish It!. She starts up Publish It!, opens the jacket template, draws a graphics frame, and imports the title-screen picture from the Fingerprint data disk. Sometimes she creates additional text — a reminder such as "Caps-Lock Key Down" — with Publish It!'s word processor. You can import public-domain graphics, digitized or scanned images, or original artwork created with paint or drawing programs, or cut and paste clip art manually from noncopyrighted books such as those distributed by **Dover Publications**.

SMALLER VERSIONS

Once you've made a template for 5.25-inch disk jackets, creating a counterpart

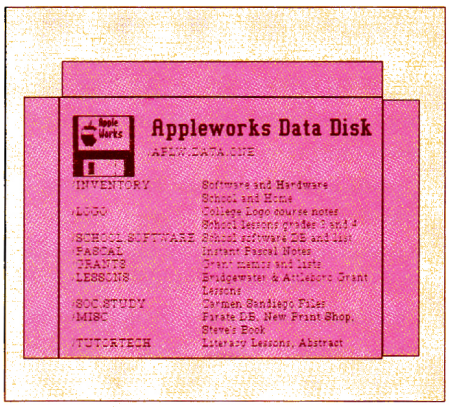


Figure 4. Sample 3.5-inch disk jacket created with Publish It! 4.

for 3.5-inch disks is even easier (**Figure 4**). The smaller version requires four objects, too — three text frames and a dashed line. Specifications are listed in **Table 2**.

After you decorate your disk jacket, be sure to save it with a meaningful name to avoid confusing a decorative layout with the original blank template. Publish It! 4 users can save a file either as a template (without text and graphics) or as a Publish It! document. Users of earlier versions must be more diligent, so that they can distinguish between templates and completed designs.

With your disk-jacket layout stored safely on a data disk, use Publish It!'s double-strike mode to print a copy. If you're creating multiple copies of your design for your classroom, for the school's computer lab, or for in-service workshops, photocopy the master. Colored paper adds a nice touch, too.

Clip out each design with scissors or a paper cutter. Fold the jacket's body along the dashed line. Fold the left and right tabs and attach them to the back of the jacket's body. We use a glue stick, but liquid glue or library paste works fine. As a finishing step, get a 6-inch plastic ruler (or graphic artist's "folding knife"), hold it at a 30-degree angle, and run it along each fold to make a uniform crease.

Designing custom disk jackets isn't just a practical project, it's an entertaining one, too — and so easy even young children can participate. After all, grown-ups can't have *all* the fun. ❑

WRITE TO CYNTHIA FIELD AT 60 BORDER DRIVE, WAKEFIELD, RI 02879. ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

PRODUCT INFORMATION

Big Red Computer Club
423 Norfolk Avenue
Norfolk, NE 68701
(402) 379-4680

The Children's Writing & Publishing Center
The Learning Company
6493 Kaiser Drive
Fremont, CA 94555
(800) 852-2255
(415) 792-2101
$59.95

Delta Drawing Today
Power Industries LP
37 Walnut Street
Wellesley Hills, MA 02181
(800) 395-5009
$69.95

Dover Publications
31 East 2nd Street
Mineola, NY 11501
(516) 294-7000

Fingerprint GSi
Thirdware Computer Products
4747 N.W. 72nd Avenue
Miami, FL 33166
(305) 389-9009
$149

Publish It! 4, $149.95
Publish It! Easy, $249.95
Timeworks, Inc.
625 Academy Drive
Northbrook, IL 60062
(800) 323-7744
(708) 559-1300

Softdisk GS
SoftDisk Publishing
P.O. Box 30008
Shreveport, LA
71130-0008
(800) 831-2694
(318) 221-8718
$29.95/3 months
$49.95/6 months
$89.95/12 months

The New Print Shop, $49.95
The Print Shop GS, $59.95
Broderbund Software, Inc.
17 Paul Drive
San Rafael, CA
94903-2101
(800) 521-6263
(415) 492-3200

inCider/A+

Problems with Advertisers: Send a description of the problem and your current address to *inCider/A+*, 80 Elm Street, Peterborough, NH 03458, attn. Rita Rivard, Customer Service Manager. If urgent, call (800) 441-4403.

Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: *inCider/A+*, Subscription Department, P.O. Box 58618, Boulder, CO 80322-8618. Or call (800) 289-0619, between 9 a.m. and 5 p.m. Mountain time, Monday through Friday. If you have a problem with payment, please have your mailing label and your canceled check or credit-card statement in front of you.

Change of Address: Send an old label or a copy of your old address and new address to: *inCider/A+*, P.O. Box 58618, Boulder, CO 80322-8618. Please give eight weeks' advance notice.

Microfilm: This publication is available in microform from University Microfilms International. United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London WC1R4EJ, England. *Dealers*: Contact Linda Ruth, Direct and Newsstand Sales Manager, *inCider/A+*, 80 Elm Street, Peterborough, NH 03458. Call (800) 343-0728.

Back Issues: Send $4.50, plus $1.00 postage for each copy to *inCider/A+*, Back Issues Dept., 80 Elm Street, Peterborough, NH 03458. For ten or more copies postage is a blanket $7.50. To order by telephone using VISA, MasterCard or American Express call (800) 343-0728, or (603) 924-0100 in New Hampshire.

inCider/A+ magazine is published monthly by A+ Publishing, a division of IDG Communications.

Entire contents copyright 1991, A+ Publishing. No part of this IDG Communications publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.

IIGS DESKTOP PUBLISHING PRINT QUALITY

With the New

Grappler®+300

IIcs Laser, Deskjet, 24-Pin Interface

Apple® IIGS owners rejoice! The **Grappler+300** unleashes the power of your IIGS for top quality text and graphics printing. You can now connect the Hewlett-Packard® LaserJet I, II, and III; the HP DeskJet, Plus and 500; PaintJet XL; most HP laser compatibles; and 24-pin dot matrix printers that emulate Epson® LQ printers including models by NEC®, Panasonic® and others.

The **Grappler+300** is a special version of the original (over 10 years old) Grappler. It contains custom software, board and cable designed to bring real desktop publishing printing quality* to your Apple IIGS. Order yours today!



Orange Micro® Inc.
"11 Years of Innovation and Excellence"

Available through
Quality Computers
1-800-443-6697

* Requires proper fonts and GS-OS 5.0+ system

© Orange Micro, Inc., 1991

Circle 48 on Reader Service Card.

PALETTE PRIMER

Learn to lay out a new palette and reveal your artwork's true colors.

By ROGER GOODE

WHAT'S THE FIRST THING MOST people do after they boot up their favorite painting program? They'll grab one of the drawing tools, choose a few bright colors, and start doodling. After the novelty's worn off they'll begin creating a simple picture — perhaps a dog, a house with a tree out front, or even a rocket ship in space.

All that's fine the first time around, and it's a good idea to get familiar with your painting program's tools. But if you want to be more than a "doodler," you've got to stop using the ever-present default palette. It's just a bright sampling of primary and secondary colors that's not much more useful than the tiny box of crayons kids use to scrawl on some restaurants' coloring-book placemats. After all, a child's sky can always be basic blue, but a graphics artist's must capture a brilliant sunset or a storm brewing on the horizon. Learning to arrange the palette and familiarizing yourself with its options is something that separates the amateurs from the pros. It's not the most exciting part of making a painting, but it's probably the most important first step in creating a successful work of art.

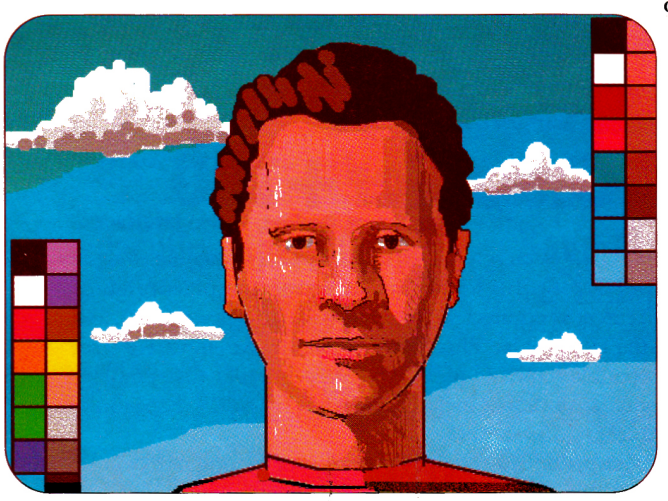


Figure. The blend-control tool helps create realistic shading.

If you're using an Apple II, organizing your palette is absolutely essential. Although your IIGS has a capable range of 4096 colors, you can choose only 16 of them for each painting you create. There's a big difference between the number of colors a system is capable of displaying and the number of colors it can display at any one time.

Even with a high-end Mac II system and a 24-bit graphics board, do some prep work. Although a Mac system like this has a capable range of millions of colors, it's limited by the number of pixels the monitor can display. If you do some simple math based on the resolution of your monitor's screen, you'll find that the number of pixels is in the high thousands perhaps, but not in the millions. And you can't display more colors than you have pixels on your screen.

CLEAR AS MUD

Although the controls may vary from program to program, the options we'll discuss here are common. Before we get started mixing our palettes, though, let's define some terms and concepts that'll help you take advantage of your system and software. There are two kinds of palettes in most programs — the one on screen in the toolbox, and the palette dialog box, which lets you adjust and customize the colors in the palette.

Most programs offer both *RGB* (*red/green/blue*) and *HSV* (*hue/saturation/value*) methods for mixing color. Although either method lets you specify your colors, you can use them together quite handily to fine-tune your color selections. With the RGB method, you simply raise the level of the red slider, for instance, and the color gets redder. If you raise the blue slider, the color looks bluer.

The HSV method bears a little more examination. *Hue* refers to the name of a color: Is it red, blue, green, or blue-green? *Saturation* defines the color's brightness (not the lightness). Imagine a glass filled with color. When you add water to it, or dilute it, it becomes less saturated with color. Add more color to the glass and it becomes more saturated. *Value* is the measure of a color's lightness or darkness. A higher value makes a color lighter and closer to white, while a lower value means it's closer to black.

If you use these two methods together, you can really speed up color adjustment. You can make some fast decisions with the HSV control (color red/bright, high saturation/middle value), for example, then fine-tune it by adding just a little bit of blue . . . just so. Of course, you may be inclined to work the other way around and make your quick adjustments in RGB and fine-tune in HSV. It's simply a matter of preference and personal style.

DIFFERENT STROKES

The first hurdle in arranging a painting's palette is the limited number of colors with which you can work. Remember, your GS can display only 16 colors at

a time, and your Mac is restricted by the monitor's resolution. Even if you switch palettes in the midst of painting, your entire design will take on the new palette's colors, retaining no shades of the previous palette. As your picture progresses you'll notice these color restrictions quickly. You might work up a nice background for a landscape, then add a couple of cows or sheep in the foreground and start to work on Farmer Brown. Oops — you're all out of new colors. You might consider changing your color scheme by painting Farmer Brown green like the landscape, or by making your landscape two shades of green rather than three and redefining that shade on the palette for the farmer. Neither option yields satisfactory results, and each involves a lot of work. The best solution is to think about what you want your picture to look like before you begin, then design a palette that fills the bill.

Some programs offer a selection of ready-made palettes, such as earth tones, grey scale, rainbow, and pastels; Beagle Bros' **Platinum Paint** for the GS is one of them ($99.95, 6215 Ferris Square, Suite 100, San Diego, CA 92121, 619-452-5500). To save time you can use one of these color schemes as a starting place, then modify it to match your specifics.

One important suggestion as you start out, though, is to leave a couple of places on the palette undefined. As you progress with your new work it's almost inevitable that you'll want to add a color or two you didn't anticipate using. You'll never regret leaving room on your palette so that it can grow with the painting.

When you're working with only 16 colors on your GS, though, not applying all of them right away is difficult. Careful planning's the key. Keep in mind that you don't need to apply all the colors in the spectrum to produce a colorful picture. Using a limited number of saturated colors with a lot of contrast can result in a painting that's both colorful and harmonious.

VALUES CLARIFICATION

Simply choosing the color of each subject in your painting is only part of the task. The most important consideration in arranging a palette isn't the color; it's the color's *value range*. To achieve the effect of form in an object you must be able to show that object in light and shade.

A red rubber ball, for example, would need values of red to show the ball's light side and darker values of the same color to show the shadow side. If you use three or more values of the color red, your ball won't appear flat. The larger the range of values, the better the effect of form, because your eye travels from light colors to dark around an object.

With the limited number of colors on the GS, creating a large range of values may seem difficult. Even the 256 colors on some Mac systems can seem limiting as you strive for greater degrees of realism. That's the nature of the medium, though, and it's the artist's job to understand those limitations and to work around them.

In terms of achieving realism, there's no better way to maximize your palette than to create a straight 16-level grey scale and work in pure light and shade. The effect is similar to making a charcoal drawing, and the results can be very pleasing.

PUT THE PROGRAM TO WORK

When the time comes to actually create a palette of your own, don't neglect to make use of the palette's tools to help streamline the process. The most useful is the *blend control*. (It may have a different name depending on your program.)

By defining two values of the same color on the palette with one or more spaces in between, and directing the program to create a blend between the two, this tool can create a range of values between two colors automatically. As quickly as you can define the first two colors that make the extremes of the blend, you can have a whole range of three, four, and up to 16 shades. After that, it's simple to adjust individual colors within the blend if you prefer not to have the range appear too regular. The human touch is always nice.

In the manner described above I created the palette for the rough portrait in the accompanying **Figure**. Because the man's face is the dominant feature of the picture, I chose to make a blend of six full steps for the flesh tones.

I began by creating a light flesh tone and then skipped down the palette five spaces and created another flesh tone of a much darker value to represent the shadow color in the face. When I was satisfied with the two colors I simply used the program's blend command to create a spread of even steps of color between the two tones.

That's the simplest method of creating a workable blend. Once you become more familiar with your program's controls and the colors you're working with, you'll want to adjust individual colors within the spread for a more personal feel.

Most paint programs also provide an array of special modes that become useful only after you've defined and arranged a blend range (or set of ranges) properly. Functions for creating shapes with graduated fills, charcoal-drawing effects, smears, washes, and shading are available regardless of how you've arranged your palette — but if you don't define a logical blend of colors, the result of using these modes will be quite a surprise. (More on these modes in future columns.)

THE ELECTRONIC ATELIER

With color computers finding their way into so many classrooms these days, it's only natural that more and more students will be using them for art projects. Teachers should find palette controls an ideal platform for practical lessons in color theory. It's simple to open a palette, for example, and demonstrate what happens when you mix two colors or change a color's value. Your students can even mix a color with its complement, then mix the same color with a grey of the same value to see the results. They'll learn a lot simply by studying the effects of different mixtures with one common color.

Don't overlook the study of value and shading by working with black-and-white in a grey scale. Perhaps that should be the starting place for any lesson on color. Once your students become comfortable working with values, they can apply that knowledge to any color in the computer spectrum. Like any good tool, the computer works best when the operator understands all its functions. There's no better place to start than working with your computer's palette. ❑

ROGER GOODE IS A FORMER ART DIRECTOR FOR *INCIDER/A+*. GRAPHICS GALLERY WILL BE LOOKING NOT AT SPECIFIC PROGRAMS AND THEIR INDIVIDUAL FUNCTIONS, BUT AT BASIC ART TECHNIQUES AND METHODS AS THEY APPLY TO THE COMPUTER MEDIUM. READERS ARE INVITED TO SHARE THEIR QUESTIONS AND INTERESTS WITHIN THAT AREA. ADDRESS YOUR CORRESPONDENCE TO GRAPHICS GALLERY, *INCIDER/A+*, 80 ELM STREET, PETERBOROUGH, NH 03458.

★ ★ ★ ★ ★

DRAGON WARS GS

Interplay Productions
3710 South Susan Street, #100
Santa Ana, CA 92704, (714) 549-2411

- fantasy role-play game
- 768K Apple IIGS, System Disk 5.0.2 or later, MidiSynth Tool 035 required for background soundtrack
- $49.95; upgrade from IIe/IIc version $15 plus original disk
- Dragon Wars Book of Lore (hints, tips, maps) $12.95



Many light years from Earth, on the small planet Oceana orbiting the star Sirius, exists the wondrous but violent land of Dilmun, a land of islands and cities, lush forests and rubble-filled caverns, slave markets and slums.

This bizarre world is populated by evil entities, madmen, ghouls and dragons, killer beasts, sadistic slave drivers, and strange people who perform and teach outlawed magical feats. In charge of Dilmun is the mightiest sorcerer of them all, the evil Namtar, the Beast from the Pit — and therein lies your challenge.

This is the world of Dragon Wars GS, the latest in fantasy role-play games from "Burger Bill" Heineman and Interplay Productions. Combining a graphics representation of Dilmun with animated adversaries, a music soundtrack, digitized sound effects, and endless combat, Dragon Wars GS is a superb mouse-driven adventure game.

TOOLS OF THE TRADE

As the game begins, you find yourself in the poverty-ridden city of Purgatory. All you know is that your goal is to defeat Namtar. Your first task is to assemble a party of four adventurers; you can use the party supplied on disk, change the names to suit your own tastes, or delete the entire party and start from scratch.

Character development is unique, easy, and fast. All members of your party start off with a default value of 10 points for various attributes.

You can add an extra 50 character points for strength, dexterity, intelligence, spirit, power, and health, or spend those 50 points on acquiring truly useful skills such as lockpicking, fistfighting, pickpocketing, hiding, and tracking.

Alternatively, you can spend your points to acquire magical abilities that will come in handy when you encounter giant spiders, mad dogs, lunatics, or, of course, Namtar himself.

INTO THE WILDS

Once your party is assembled, you'll go off in search of adventure, and it won't take long for trouble to find you. You may be approached by a band of thieves, or unjustly accused prisoners, or a giant spider, or a guard — and all of them seem to have just one thing in mind: killing you and massacring your party.

All important battle decisions are implemented by clicking on the available options from an impressively detailed list. As you defeat your opponents, you'll acquire additional health points and attain new skill levels.

If your opponents defeat you, one or more members of your party may be "stunned" — forced to sit on the sidelines during the next battle — or may even be killed. If you have enough magical abilities, you may learn how to resurrect your fallen comrades.

The longer you play the game, the more points you'll get, and the more items and magical spells you'll acquire. You'll need all the ammunition you can buy or find if you hope to be a match for Namtar.

GAME-PLAY DETAILS

As you wander around the world (an endeavor greatly simplified by an automatic mapping system) slaying all those evil characters and befriending wizards, the game will often instruct you to consult the accompanying 40-page manual to read one of the nearly 150 paragraphs included. These informative passages are included as an innocuous form of copy protection, yet they enhance game play and add much to the storyline.

The game is supplied on a single 3.5-inch disk and comes with a reference card as well as the manual. The disk isn't copy protected, and you can install it on a hard-disk drive.

The Dragon Wars program disk isn't bootable; you must launch the game from the GS System Disk. The musical score was created with Apple Computer's MidiSynth tool (Tool 035); you'll need a copy of the tool to hear the soundtrack. You can download MidiSynth from an on-line network, get it from an Apple user group, or ask Interplay to mail it to you for the cost of shipping and handling.

Until you have Tool 035, you'll miss out on the soundtrack, but that doesn't have any effect on game play. As with all of Bill Heineman's games, there's lots of humor, and an obligatory "Easter Egg." (As you move around Dilmun, look for the statue of St. Stephen.)

Dragon Wars is fun to play and easy to navigate because it's completely mouse controlled. The fine graphics and soundtrack, together with maze navigation, fierce battles, and a lively storyline, are bound to have you coming back for more super-hi-res fun week after week.

Joe Kohn
San Rafael, CA

★ ★ ★ ★ ★

DESERT STORM: THE WAR IN THE PERSIAN GULF

Warner New Media
3500 West Olive Avenue, Suite 1050
Burbank, CA 91505, (818) 955-9999

- multimedia magazine on CD-ROM
- Mac Plus or later, 1MB, System 6.0.5 or later LC and IIsi require System 6.0.7 or later
- Mac-compatible CD-ROM drive; color machines require 2MB and 640 by 480 pixels screen; Mac LC with 12-inch monitor displays in black-and-white
- $39.99

In an age of microwave fast food, cash-on-demand automated tellers, and global communications, computers deliver instant gratification with a few simple keystrokes. Now Warner New Media (Time Warner's electronic-publishing division) carries the initiative one step further with its release of Desert Storm. This multimedia CD-ROM, published in association

with *Time* magazine, harnesses the power of computers to trumpet the dawn of a new era in electronic journalism.

THE NEXT BEST THING TO BEING THERE

Desert Storm is a remarkable product. Time Warner released the disc in mid-April, just weeks after the liberation of Kuwait City by Allied forces. The CD contains more than 6000 pages of text (mainly original news dispatches from *Time* correspondents in the field), hundreds of color photographs, maps, taped interviews, and voice-over narrations. Viewers read, see, and hear all about the Persian Gulf conflict from the desktop of a Macintosh computer.

This CD-ROM "newsdisc" features a week-by-week examination of events as they were covered by *Time* correspondents from all over the world. Not only do you have access to actual data sources (such as photos, reports, and taped interviews), but you can read the stories that ultimately appeared in *Time*.

MIDEAST TOUR

A friendly user interface makes locating disc materials easy, while point-and-shoot cursor control lets you select items of interest for detailed investigation. First-time viewers should select the *Guided Tour* module for a quick summary of program features and some basic CD-ROM navigation instructions.

If your hard disk has sufficient free space, Time Warner recommends copying the program and its data file from CD-ROM to hard disk. (A hard disk retrieves data much more quickly than CD-ROM, so you'll notice improved performance resulting from speedier information access.) You'll need about 8.5 megabytes of hard-disk space for color systems, but only 4.5 megabytes for black-and-white displays.

Desert Storm's *Calendar Screen* greets you at startup. From this screen you can obtain information on the events of the war for any week of the crisis from January 7 through March 3, 1991. Each week features a brief descriptive caption (*Week 1: Prelude to War*, *Week 2: The Storm Erupts*, *Week 3: Stalking Saddam*, and so on) to aid in the selection process.

Once you choose a week for in-depth examination, you'll see its war events organized into a lead-story list. For *Week 6: Diplomacy's Last Try*, for example, you'll find a list of 14 lead stories with titles such as *Saddam's Endgame*, *If Saddam Pulls Out*, *Coping with Chemicals*, and *Inside the Air War*. Each lead constitutes a story *Time* editors assigned to correspondents stationed all over the world.

Select a particular lead story and its associated *Newsdesk* appears. At the *Newsdesk*, you read unedited *Incoming Reports*, the raw news files submitted by *Time* correspondents from the field. You can also view photographs depicting images of war or listen to audio clips (consisting of on-the-ground reports, interviews, and taped recordings) for some sense of the sounds of war.

War Maps, another *Newsdesk* option, provides a glimpse of battlefield strategies for the week. In addition, the *Time Magazine Story* option lets you read the actual lead story as it appeared in *Time* magazine after editing.

For more information on the people, places, and events of war, turn to Desert Storm's detailed index. This comprehensive list serves up a wealth of information on the people, places, weapons, and documents of the Gulf War, and acts as a cross-reference for *Time*'s own photographs, audio clips, and raw and edited stories. The index also contains a timeline with a brief narrated synopsis of the war for every week of the crisis.

IF THINGS WERE ONLY DIFFERENT . . .

Desert Storm holds an extraordinary collection of reference materials, but the product has limitations. First, unlike some other computer-controlled CDs, this disc is truly "read-only." You can't copy text to the clipboard for pasting into other applications.

In addition, you can't print any dispatches or *Time* magazine articles. The read-only aspect of this product means that researchers will have to take notes by hand, a fact that limits the disc's usefulness in a single-computer classroom.

Second, Desert Storm has very little printed documentation. There's no user's manual. The disc's nine-page booklet

Pay As Little As $3.33 per Disk (See Special Below)

APPLE IIgs, IIe, IIc

Quality Software Reliable Service

FREE IIgs Disk!

California Demo Disk With Any Order Over $39!

60's Beachboys meets the Computer Age in this fantastic new demo featuring graphics, animation, and digitized music. A PDE EXCLUSIVE—A MUST HAVE!

(This special offer may only be used when ordering disks from this ad.)

APPLE IIgs 3-½" DISKS

Word Processing

☐ GS229 Elfwrite Easy-to-use w/doc. + 117 fonts! ★ Best Seller $9

Print Shop™ IIGS Graphics—PDE Exclusives!

☐ GS156 100 color pictures of people, faces, clothing* $9
☐ GS158 100 color pictures of symbols, emblems, & logos* . $9
☐ GS177 100 educational pictures: history, science, geog., flags* . $9
☐ NEW GS199 100 color pictures of sports, hobbies, games, #2* . $9
☐ NEW GS207 100 color pictures with a nature theme* $9

* Requires Print Shop™ IIGS to use.

Graphics/Graphic Utilities

☐ GS63 Cheap Paint: full-featured color pnt. prog. (768K REQ)(SW†) . $9
☐ NEW GS269 24 color graphics: Schwartzeneggar, Madonna, etc. . $9
☐ NEW GS276, GS279 Lifelike 3200-color photos of animals & science-fiction (Needs Dream Graphics™ to Edit/Print)(2-Disk Set). . . . $18

Games/Entertainment/Education

☐ GS221, GS222 Cosmocade—blow away aliens in the jungle and in space, along with music, joystick (2 DISK SET)(SW†) . . . $18
☐ GS233 Columns—Addictive puzzle arcade w/music. $9
☐ GS248 Star Trek Classic—game with stereo and great graphics. (REQ1.5 MEG, AND SYSTEM 5.0.4) (SW†). $9
☐ GS252 Loderunner.GS—collect prizes, avoid monsters! . . . $9
☐ GS265 Plotting—Latest Tetris style "block" game. $9
☐ NEW GS271 Milestones 2000—Addictive car game. . . . $9
☐ NEW GS274 Bill of Rights—First Amendment + Quiz (SW†) . $9
☐ NEW GS280 Eclipse—Calculate past eclipse dates (SW†) . $9
☐ NEW GS282 Elevators: Dodge elevators/insane aliens . $9
☐ NEW GS287 Dr. Mario: Kill viruses in Tetris™ style game . $9

Utilities

☐ NEW GS281 Command.Com—MS-DOS style utilities (SW†) . $9

Adult Graphics

☐ GS234, GS237 Gorgeous girls dazzle you! (2 DISK SET)(SW†) . $18
☐ NEW GS255 thru GS262 Sizzling summer swimsuits & R-rated girls. Over 150, 3200-color graphics on 8 disks $72
☐ ANY 10 DISKS FOR ONLY $59.95

APPLE II 5-¼" DISKS

Apple II Print Shop™ Graphics

☐ 937 70+ b/w pictures of sports, hobbies, games* $5
☐ 938 70+ b/w pictures of people faces, clothing* $5
☐ 939 70+ b/w pictures of animals of every kind!* $5

* Requires Original Print Shop™ to use.

Games/Education

☐ 814 Monopoly: The popular board game $5
☐ 974 Flobynoid—great Tetris™ clone. More $5
☐ 976,977 World of Pinball: 14 great pinball games (2 DISKS) $10
☐ 985, 986 Make Wordsearch puzzles. prints (2 DISK SET) $10
☐ NEW 1005 Berzap!—Fight robots & escape from maze (SW†) $5
☐ NEW 1006 Columns—Dbl-hires 128K puzzle arcade $5

Passion

☐ 190, 800 X-Rated graphics for adults only (2 DISK SET) $10
☐ 961, 962 Beach Girl, more lovely ladies (2 DISK SET) $10

Telecommunications

☐ NEW 1002 Agate ANSI modem program with Zmodem . . . $5

† The author requests a specified donation if you decide to use the program.

SPECIAL!

Any 6 disks (IIgs disks may be included) plus 1 Yr. Membership

Only $39.95 (plus $4.50 s/h)

One Yr Membership ($20 value):
- Complete fully-indexed directories of software
  - ☐ Apple directory describing over 5000 programs. OR
  - ☐ Apple IIGS directory describing 1000 programs
- 28 pg qtrly Magazines w/100's of new software selections
- Members-only discounts!
- Plus 6 disks of your choice (ONLY $3.33 each!—only as part of this special)

Add $4.50 US & $5 Canada ($15 foreign) shipping/handling for orders. CA orders add sales tax. If ordering a 6 disk Special, please check 1 box:
☐ Apple II Membership ☐ Apple IIGS Membership

Enclosed $_____ by ☐ Check ☐ VISA ☐ MC
Card No._____ Exp._____
Name_____
Address_____
City_____ State___ Zip_____

In California 408-496-0624

P.D.E. 2076-C Walsh Ave., #797 Santa Clara, CA 95050

CALL TOLL FREE 800-331-8125

Circle 269 on Reader Service Card.

devotes more space to the events of war than to system setup. A "read me" text file on disc contains some troubleshooting hints, keyboard shortcuts, and hard-disk installation procedures, but it's too brief.

Despite the product's read-only limitations and meager documentation, Time Warner's Desert Storm represents an amazing compilation of materials, with news coverage literally hot off the press. Correspondent dispatches traveled from newsdesk to newsdisc to retail shelves in a matter of days, shortening a publishing process that typically takes conventional CD-ROM six months to a year.

While the balance of power in the Mideast remains unclear, and the full aftermath of the Persian Gulf conflict has yet to unfold, one fact remains certain: The story-rich electronic environment of the Desert Storm CD-ROM delivers an extraordinary amount of multimedia information in an interactive format for a price that can't be beat.

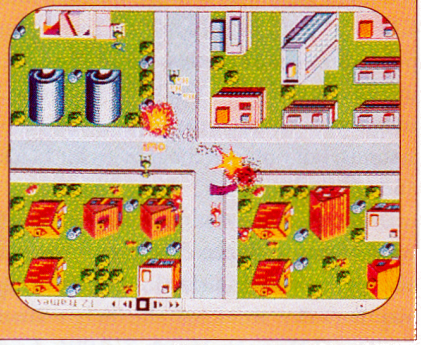
Carol Holzberg
Shutesbury, MA

★ ★ ★ ★ ★

ROBOSPORT

Maxis Software
2 Theater Square, Suite 230
Orinda, CA 94563, (415) 254-9700

- strategy game
- Mac Plus, SE, Classic, SE/30, LC, Mac II, IIcx, IIsi, IIci, IIfx, and Portable
- black-and-white, 16 color, or 16-grey scale; 1MB for black-and-white, 2MB for color
- hard disk recommended, hard disk or SuperDrive required for color
- off-disk copy protection
- $59.95



The machines have taken over! Far in the future, intelligent machines have surpassed humankind on the "evolutionary" chain. They keep humans around,



Sometimes turning a group into a team is like trying to raise the dead.

Breathe new life into your classrooms with *Wagon Train 1848.*

How would you describe your feelings when you try to get students to work in teams? If you have come to dread every attempt, it's time for a startlingly fresh lesson in cooperative learning—*Wagon Train 1848* for the Macintosh.

Wagon Train 1848—a software simulation unlike anything else on the market today—teaches kids interdependence. A decision made by one member of the group can come back to haunt everyone else later. So survival means working *together* to get everyone safely to the Oregon Territory.

To experience what an alarmingly positive team your students can be with *Wagon Train 1848*, call . . .

800/685-MECC
MECC • 6160 Summit Drive North
Minneapolis, Minnesota 55430-4003

mecc
For the love of learning.

Circle 5 on Reader Service Card.

but view them with amused disdain. These humans, though, are happy only when they're at war. To cut down on the loss of life and the general chaos that follows, the machines create *RoboSports*, war games fought by replaceable robots.

LET THE GAMES BEGIN

In RoboSport, you're the human commander of a team of robots battling in one of five different "sports" — *Survival*, *Capture the Flag*, *Hostage*, *Treasure Hunt*, and *Baseball* — over a wide range of terrain, battle sizes, and types.

You can play against a computer opponent that becomes smarter and more dangerous as you go on, or you can hunt the most dangerous prey — another human player. Each fight lasts until one team is completely destroyed.

When the game begins, the software presents you with an overhead view of the playing field and you have to "program" your robots to play using the "See++" or "totally visual programming language." The interface is completely mouse driven and easy to learn.

One by one, you program each robot for a set amount of time per turn (15 to 40 seconds) as part of your overall strategy. You can even set up an ambush or an all-out attack. Simply move a robot into position, choose a weapon, point it in the desired direction, scan, and fire. The robot will either fire when an opposing robot enters its scanning range or when you've programmed it to fire.

You can also administer a deadly zap to opponents and leave bombs as booby traps. Each weapon does varying degrees of damage, and it may take several hits to destroy a robot.

After you've programmed each robot on your team, the computer generates the turn, and you watch the action unfold. The fun lies in not knowing what your opponent will do next. Enemy robots aren't visible unless there's a direct line of sight between one of your robots and the enemy, and you're facing the right direction. Watch out for those sneak attacks!

You can play back your turn as many times as you care to watch, and, as games get more complicated, you'll find yourself watching a turn again and again to discover the little nuances of the play and the location of the other team.

After a turn is over, RoboSport offers data for each team, telling you the health and location of each robot. If you've gleaned some information about your opponent's strategy and the location of his minions, you can program your robots to thwart his evil plans.

When the game is over, RoboSport enters the closing ceremony phase, in which it awards points and offers statistics on play, such as the number of shots fired by each team, the number of those hit, the types of explosives that were damaging, and so on.

KEEP PLAYING

Once you get the hang of it, RoboSport is an enjoyable play. I got creamed by the computer several games in a row, but I learned to outsmart the other team by staying low, scanning and firing at the right time, and setting up ambushes. After a while, I was winning about 90 percent of the time.

After you've mastered all levels of RoboSport, you can program your own teams and opponents and play them. RoboSport's difficult to outgrow, because you can create clever, powerful opponents to challenge you.

Even though you really don't need to read the manual, it includes good start-up instructions, hints for playing better, and a great deal of detail about each game and robot — and, besides, it's a barrel of laughs. It even sports instructions on conducting multiplayer games over modem lines and AppleTalk networks, and for saving the games to play back at a later time with *RoboPlayer*, a companion program.

One gripe is that RoboSport doesn't work well with MultiFinder, even when 2 megabytes' worth of RAM is devoted to the program. My version quit several times. I finally gave up and restarted my system before using RoboSport. I left MultiFinder on, but because it was the only program running, I had no difficulty. RoboSport is an excellent game, though. It's fun and easy to play, difficult to outgrow thanks to its programming mode, and very clever. Maxis has another winner. ❑

Jordan Gold
Palo Alto, CA

On the serious side...

Making Decisions— Together.



Dale LaFrenz, President and CEO of MECC, is an experienced classroom teacher and a nationally recognized leader in educational technology.

How do educators bridge the gap between technology and the theories of cooperative learning? The answer is easy—with MECC's innovative and interactive cooperative-learning product *Wagon Train 1848*! *Wagon Train 1848* puts kids in the shoes of nineteenth-century pioneers traveling in Macintosh "wagons" on their way from Independence, Missouri, to the famed Willamette Valley in Oregon. With its ease of use, detailed graphics, historical accuracy, and cooperative networking features, *Wagon Train 1848* is a whole new way to use computers in the classroom.

Survival means teamwork.

Wagon Train 1848 is "groupware," software that students use together via an AppleTalk® network to achieve their goal. Players must work as a team to survive mishaps and other random events, just as real pioneers did. They "talk" and trade with one another, make decisions cooperatively, and hold "conferences" on critical issues. One person's troubles—such as illness, food shortage, or a broken wagon wheel—are problems for the entire wagon train. Players will have to solve problems and carefully monitor everyone's health and safety. They may encounter Indians and other emigrants who want to trade goods, and they may have to hunt for food. Players who reach Oregon with a safe and healthy party receive high scores individually and as a group, which means that they must work as a team in order to succeed.

A new frontier in classroom adventure.

So what was it like to travel 2,000 miles in a covered wagon across the rugged frontier? To make life-or-death decisions affecting an entire wagon train? To find out, discover *Wagon Train 1848* and bridge the gap between cooperative learning and computers.

For more information about *Wagon Train 1848* or any other MECC software packages, call 800/685-MECC, or write to MECC at 6160 Summit Drive North, Minneapolis, Minnesota 55430-4003.

mecc
For the love of learning.

Circle 5 on Reader Service Card.

LOGO: MULTIMEDIA FOR EVERYONE

By DAVID D. THORNBURG, Ph.D.

One of my current challenges is finding enough electrical outlets to support all the gadgets I've connected to my computer. The reality of multimedia is that it's cable intensive. By the time you've connected a laser videodisc player and a CD-ROM drive to your computer, the room seems to have more cables than equipment. Even so, the effort is worth it — multimedia is an effective communication tool because it supports people's natural ways of learning. While my generation grew up in the left-right, top-bottom world of Gutenberg's printed page, today's youth has grown up in a world of random access. The channel-change button on a television remote control provides a very different model for navigating through the space of ideas from that offered by a text-based index.



Multimedia's power lies far deeper than its resonance with our current ways of viewing knowledge. Each of us (according to Harvard University's Professor of Education Howard Gardner) has multiple intelligences — seven ways of appropriating and processing knowledge. Of these, only three (the linguistic, intrapersonal, and logical mathematical) are addressed adequately by print-based information. While this meets the needs of perhaps 20 percent of our population, the rest of us thrive in environments in which information is provided in ways that support the spatial, musical, bodily-kinesthetic, and interpersonal intelligences. For this reason, some people learn best from interactive video presentations, and others learn best from printed books. If we all possess a unique blend of intelligences that shape the way we learn, shouldn't school systems incorporate the full spectrum of learning patterns, so that no child is left underdeveloped?

Multimedia provides the perfect technology to support this kind of learning — multimedia and multiple intelligences fit like a glove. Even so, the perceived high cost and complexity of multimedia workstations have prevented some educators from getting up to speed. But the latest and greatest technology needn't be the only solution. Take some time and reintroduce yourself to an old favorite — the Logo programming environment. You'll find a multimedia tool already at your fingertips.

I came to this realization while working in Brazil a few months ago. Brazilian public schools are, in general, very poor. Most of them have no technology beyond the blackboard, and those that have computers are limited to old models with a very small range of software. One school I visited was fortunate enough to have a lab of 15 computers. Those teachers and students had only one title, but that was Logo. If you have only one educational application for a computer, Logo is a good choice.

Logo grew out of the research interests of MIT's Seymour Papert — a strong believer in the notion that children learn best when they're the constructors of their own knowledge. He wanted students to have access to a computational environment in which they could experiment with concepts, constructing microworlds of their own design, and exploring the properties of these microworlds.

One of Logo's most popular (but by no means its only) built-in microworlds is based on an object called a "turtle," which moves around on screen in response to your commands, leaving lines as it goes. By instructing the turtle to move and turn, you can create pictures of incredible complexity. You can bundle combinations of commands into *procedures*, which effectively extend the power of the language by adding new words to its vocabulary. Using Lego Systems' **Lego TC Logo** (reviewed in June 1988, p. 32) or

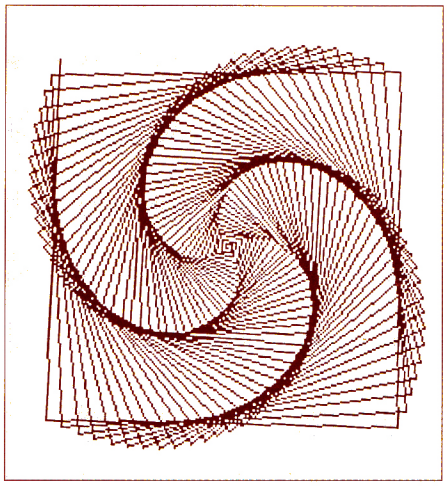


Figure. Complex shape created with Logo's turtle commands.

Logo Computer Systems' **LogoWriter**, for example, and the sample procedure below, you can create the accompanying **Figure**. Type *squiral 1* to see the program create the design on screen:

```
to squiral :step
if :step > 180 [stop]
forward :step
right 91
squiral :step + 1
end
```

MORE THAN TURTLES

In addition to this rich graphics environment, Logo is designed to work with words and sentences. In fact, the Apple II products LogoWriter and **LogoWriter GS** (reviewed in August 1990, p. 80) are designed to let you create documents containing text, pictures, programs, sound, and even animation — in short, to provide basic "multimedia" experiences to students and teachers who have nothing more complex than an Apple II on their desks.

Although I've written numerous books on Logo over the years, I must confess that I've paid less attention to this product recently because I've become more excited by hypermedia authoring tools such as HyperCard, TutorTech, and HyperStudio because of their support for laser discs and other gadgets. While I still believe that hypermedia authoring environments are preferable for creating larger projects, Logo is the perfect tool for exploring alternative ways of presenting ideas.

The beauty of multimedia — and of Logo — is that it lets all children, regardless of each youngster's unique combination of intelligences, express their ideas. Whether it's a simple design or a complex presentation, Logo can help a child discover the fun of learning.

While visiting the computer lab in a São Paulo elementary school, for example, I was struck by one child in particular, Joana, who had created a wonderful picture of the cartoon character Snoopy. She had composed this design through Logo procedures that drew various parts of Snoopy's face in sequence, then colored them in. Later I found that this child suffers from perceptual difficulties both in hearing and reading. Her work with Logo was providing her with the chance to succeed at a challenging task. At the time I visited with her, she had just completed this complex project without any outside support. Her self-confidence had improved, and she was beginning to see herself as a capable learner.

Joana's story has been told before, and it's being retold through the experiences of children all over the world. Technology, used properly, can aid us in transforming education in ways that help every learner grow. The power of tools that provide multiple ways of representing knowledge is that they honor each person's preferred way of learning.

Have you brought the power of Logo to the Joanas in your part of the world? ❑

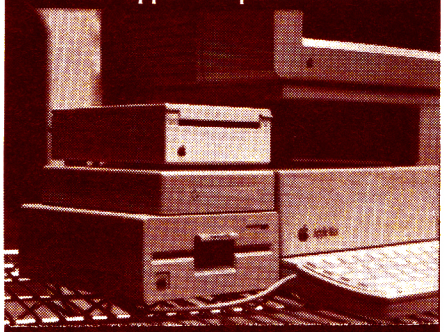
IN ADDITION TO HIS WORK IN BRAZIL, DR. THORNBURG IS ASSISTING IN VARIOUS RESTRUCTURING PROJECTS HERE IN THE UNITED STATES. WRITE TO HIM AT THE THORNBURG CENTER, 1561 LAUREL, SUITE A, SAN CARLOS, CA 94070.

PRODUCT INFORMATION

Lego TC Logo
Lego Systems Inc.
555 Taylor Road
Enfield, CT 06082
(203) 749-2291
$485

LogoWriter,
$89 home edition, $199 starter pack
LogoWriter GS, $169
Logo Computer Systems, Inc.
3300 Cote Vertu Road
Suite 201
Montréal, Québec
Canada H4R 2B7
(800) 321-5646

Hard Drive
for IIgs, IIe & Mac
incl. Apple Hi Speed SCSI Card



Half Shell -- the hard drive that is 30% smaller than the floppy drive
1.4"x5.5"x7.5"
40MB(25ms) - $409
120MB(19ms) - $589



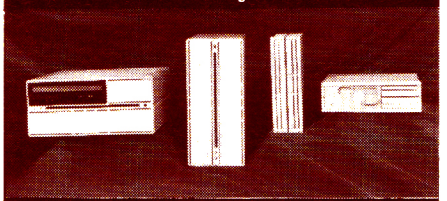
A-Hive Jr. -- small size
7.1"x7.1"x2.2"

Hard drive	40MB	$449
	60MB	$549
	84MB	$559
	120MB	$629
	170MB	$909
	200MB	$909
Tape drive	155MB	$499

A-Hive -- expandable
9.9"x9.6"x4.3"

Hard drive	100MB	$ 639
	426MB	$1689
Cartridge drive	44MB	$ 629
	88MB	$1114

Hard/tape drives combo
Hard/cartridge drives combo
add $89 for RamFast SCSI card
also Hard Drive for Laser 128



Tulin Corporation
2156H O'Toole Ave.
San Jose, CA 95131
Tel: 408-432-9025
Fax: 408-943-0782

Circle 231 on Reader Service Card.



HINTS

AUTOMATED APPLEWORKS

A definition here, a shortcut there — our information swap can help you stay one step ahead of frustration.

By WILL NELKIN

FAST FILE CREATION

Create new AppleWorks files in a snap — the macros listed in the accompanying **Figure** box will do the work for you. Here are two special tips to keep in mind:

1. The keystroke combination Open apple-Q-Escape, a.k.a. **<oa-Q><esc>**, will take you directly to the main menu from anywhere in AppleWorks, even from deep within branching menus. (Try it by hand, if you're unfamiliar with it: Take yourself down into the *Printer Codes* menu and press these two keystrokes.) You can use this combination in any number of macros to guarantee a known starting point for file activity.

2. The *Display* command is a new feature available to AppleWorks 3.0/UltraMacros users. **<Display #off>** or **<display 0>** freezes the screen while macro activity takes place invisibly.

Two things to note: If you use one of these commands in a macro, be sure to "unfreeze" the screen before the macro stops by including **<display #on>** or **<display 1>**; also, some routines, such as *Find* and *Read*, require the current screen to be visible, so you must unfreeze the screen before you perform such functions.

Keep a macro available in the compiled set as a "screen restorer" in case another macro hangs or aborts while the screen is still frozen. Here's one example:

<ba-Z>:<all><display #on esc>!

Note the escape command. **<Display #on>** unfreezes the screen, but nothing changes until AppleWorks redraws it. Calling **<esc>** forces the screen to refresh. Return (**<rtn>**) achieves the same effect.

To test these macros, first type them into an empty AppleWorks word-processor file. To use the full screen width, enter **Left Margin: 0** and **Right Margin: 0** from the *Printer Options* menu (OA-O).

Now enter **start** on the top line, all by itself. (You don't have to enter the descriptive information inside the curly brackets unless you want a record of what each line of the macro does.) When you've typed the whole sequence, look it over to make sure you haven't omitted anything, especially a colon, a space, or an angled bracket (<>).

To compile these macros, press **OA-Escape** to call up your *TimeOut* menu, and select *Macro Compiler*. When that menu appears, select the first option, *Compile a new set of macros*. Press **N** to avoid pausing, followed by **B** to start from the beginning of the file. Note that UltraMacros 3.1 users may simply press **OA-Return** at the first selection to *Compile a new set*, bypassing the two questions. AppleWorks 2.x-series users must delete the **<display #off>** and **<display #on>** commands to compile the macros, and must suffer those flashing screens — or, upgrade to 3.0.

If you typed the macros correctly, they'll compile without error. Try them out: Hold down the solid-apple key and tap the appropriate number key for the type of file you want to create.

Because we used the **<all>** domain token, you can call these macros at any time, from anywhere in the world of UltraMacros-enhanced AppleWorks. ❑

Figure. Macros help you "automate" the AppleWorks file-creation sequence.

```
start
=====================================================

1:<all><                    { CREATE NEW DB FILE FROM ANYWHERE       }
 display #off:              { freeze screen display to hide activity }
 oa-Q esc:                  { go straight to the Main Menu           }
 rtn>4<rtn rtn>LIST<:       { create a new DB file from scratch      }
 display #on rtn>!          [ restore screen activity                ]

From this point, take it by hand, entering the database category names
you want to define.


2:<all><                    { CREATE NEW SS FILE FROM ANYWHERE       }
 display #off:              { temporarily freeze screen display      }
 oa-Q esc:                  { go straight to the Main Menu           }
 rtn>5<rtn rtn>DIGIT<:      { create a new SS file from scratch      }
 display #on rtn>!          [ restore screen activity                ]


3:<all><                    { CREATE NEW WP FILE FROM ANYWHERE       }
 display #off:              { temporarily freeze screen display      }
 oa-Q esc:                  { go straight to the Main Menu           }
 rtn>3<rtn rtn>WORD<:       { create a new WP file from scratch      }
 display #on rtn>!          [ restore screen activity                ]

=====================================================
```

Free Product Info

DIRECT TO YOU
AT NO COST OR OBLIGATION

Want to Know More About Products Or Services Advertised In This Issue?

Here's How.

- Print your name and address where indicated.
- Tell us about yourself by answering the questions.
- Circle the numbers on the card corresponding to the reader service number for products or services that interest you.
- Tear out and mail the card.
- Subscribe to *inCider/A+* by checking off the ❑ where indicated. We'll bill you $27.97 for 12 issues of *inCider/A+*.* **That's 40% off the cover price.** Look for your subscription in 6-8 weeks.

NO OBLIGATION. Literature on products and services will be sent to you directly from advertisers, free of charge.

* *This rate is limited to the U.S. and its possessions.*

inCider A+ Apple II/Macintosh

Reader Service Card

October issue
Valid until
December 15, 1991

Name _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

❑ Check here to start your subscription to *inCider/A+*. You will be billed $27.97 for 1 year (12 issues).*

I What computer do you use and/or plan to buy in the next 3 months?

	Use	Plan to buy
Apple II	❑ 1	❑ 4
Macintosh	❑ 2	❑ 5
IBM/MS-DOS	❑ 3	❑ 6

Which model?

Apple IIgs	❑ a	❑ i
Apple IIe/c/c Plus	❑ b	❑ j
Mac SE/Mac Plus	❑ c	❑ k
Mac Classic	❑ d	❑ l
Mac LC	❑ e	❑ m
Mac SE/30	❑ f	❑ n
Mac II series	❑ g	❑ o
Other computer	❑ h	❑ p

II Are you an educator? Yes ❑ q

1	26	51	76	101	126	151	176	201	226	251	276	301	326	351
2	27	52	77	102	127	152	177	202	227	252	277	302	327	352
3	28	53	78	103	128	153	178	203	228	253	278	303	328	353
4	29	54	79	104	129	154	179	204	229	254	279	304	329	354
5	30	55	80	105	130	155	180	205	230	255	280	305	330	355
6	31	56	81	106	131	156	181	206	231	256	281	306	331	356
7	32	57	82	107	132	157	182	207	232	257	282	307	332	357
8	33	58	83	108	133	158	183	208	233	258	283	308	333	358
9	34	59	84	109	134	159	184	209	234	259	284	309	334	359
10	35	60	85	110	135	160	185	210	235	260	285	310	335	360
11	36	61	86	111	136	161	186	211	236	261	286	311	336	361
12	37	62	87	112	137	162	187	212	237	262	287	312	337	362
13	38	63	88	113	138	163	188	213	238	263	288	313	338	363
14	39	64	89	114	139	164	189	214	239	264	289	314	339	364
15	40	65	90	115	140	165	190	215	240	265	290	315	340	365
16	41	66	91	116	141	166	191	216	241	266	291	316	341	366
17	42	67	92	117	142	167	192	217	242	267	292	317	342	367
18	43	68	93	118	143	168	193	218	243	268	293	318	343	368
19	44	69	94	119	144	169	194	219	244	269	294	319	344	369
20	45	70	95	120	145	170	195	220	245	270	295	320	345	370
21	46	71	96	121	146	171	196	221	246	271	296	321	346	371
22	47	72	97	122	147	172	197	222	247	272	297	322	347	372
23	48	73	98	123	148	173	198	223	248	273	298	323	348	373
24	49	74	99	124	149	174	199	224	249	274	299	324	349	374
25	50	75	100	125	150	175	200	225	250	275	300	325	350	375

inCider A+ Apple II/Macintosh

Reader Service Card

October issue
Valid until
December 15, 1991

Name _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

❑ Check here to start your subscription to *inCider/A+*. You will be billed $27.97 for 1 year (12 issues).*

I What computer do you use and/or plan to buy in the next 3 months?

	Use	Plan to buy
Apple II	❑ 1	❑ 4
Macintosh	❑ 2	❑ 5
IBM/MS-DOS	❑ 3	❑ 6

Which model?

Apple IIgs	❑ a	❑ i
Apple IIe/c/c Plus	❑ b	❑ j
Mac SE/Mac Plus	❑ c	❑ k
Mac Classic	❑ d	❑ l
Mac LC	❑ e	❑ m
Mac SE/30	❑ f	❑ n
Mac II series	❑ g	❑ o
Other computer	❑ h	❑ p

II Are you an educator? Yes ❑ q

1	26	51	76	101	126	151	176	201	226	251	276	301	326	351
2	27	52	77	102	127	152	177	202	227	252	277	302	327	352
3	28	53	78	103	128	153	178	203	228	253	278	303	328	353
4	29	54	79	104	129	154	179	204	229	254	279	304	329	354
5	30	55	80	105	130	155	180	205	230	255	280	305	330	355
6	31	56	81	106	131	156	181	206	231	256	281	306	331	356
7	32	57	82	107	132	157	182	207	232	257	282	307	332	357
8	33	58	83	108	133	158	183	208	233	258	283	308	333	358
9	34	59	84	109	134	159	184	209	234	259	284	309	334	359
10	35	60	85	110	135	160	185	210	235	260	285	310	335	360
11	36	61	86	111	136	161	186	211	236	261	286	311	336	361
12	37	62	87	112	137	162	187	212	237	262	287	312	337	362
13	38	63	88	113	138	163	188	213	238	263	288	313	338	363
14	39	64	89	114	139	164	189	214	239	264	289	314	339	364
15	40	65	90	115	140	165	190	215	240	265	290	315	340	365
16	41	66	91	116	141	166	191	216	241	266	291	316	341	366
17	42	67	92	117	142	167	192	217	242	267	292	317	342	367
18	43	68	93	118	143	168	193	218	243	268	293	318	343	368
19	44	69	94	119	144	169	194	219	244	269	294	319	344	369
20	45	70	95	120	145	170	195	220	245	270	295	320	345	370
21	46	71	96	121	146	171	196	221	246	271	296	321	346	371
22	47	72	97	122	147	172	197	222	247	272	297	322	347	372
23	48	73	98	123	148	173	198	223	248	273	298	323	348	373
24	49	74	99	124	149	174	199	224	249	274	299	324	349	374
25	50	75	100	125	150	175	200	225	250	275	300	325	350	375

Free Product Info

DIRECT TO YOU
AT NO COST OR OBLIGATION

PLACE STAMP HERE

inCider/A+
ATTN: Reader Service Dept.
P.O. Box 8987
Boulder, CO 80329-8987

PLACE STAMP HERE

inCider/A+
ATTN: Reader Service Dept.
P.O. Box 8987
Boulder, CO 80329-8987

Want to Know More About Products Or Services Advertised In This Issue?

Here's How.

- Print your name and address where indicated.
- Tell us about yourself by answering the questions.
- Circle the numbers on the card corresponding to the reader service number for products or services that interest you.
- Tear out and mail the card.
- Subscribe to *inCider/A+* by checking off the ❑ where indicated. We'll bill you $27.97 for 12 issues of *inCider/A+*.* **That's 40% off the cover price.** Look for your subscription in 6-8 weeks.

NO OBLIGATION. Literature on products and services will be sent to you directly from advertisers, free of charge.

** This rate is limited to the U.S. and its possessions.*

READER SERVICE

Reader Service		Page
40	Abracadata	23
103	Alltech Electronics Co.Inc	9
*	Applied Engineering	CV4, 14,15
64	Arminius Publications	66
87	Bible Research Systems	68
34	Bix	67
21	Co-Du-Co	68
11	Compsult	66
8	ComputerWorks	67
220	Creative Persuit	12
*	Dayton Computer Supply	66
220	Educational Resources	13
85	Fas-Track Computer Prods	11
24	Frog Systems	69
*	inCider/A+	
*	Art Gallery	71
*	AppleWorks Gs	65
44	LRO Computer Sales	27
5	Mecc	60,61
248	Memory Plus Distribution	50
13	Microgram Systems	66
55	National AW User Group	68
16	OEM Corporation	68
48	Orange Micro	55
59	Perfect Solutions	68
121	Power Industries	67
*	Preferred Computing	28,29
105	Price Busters	51
269	Public Domain Exchange	59
136	Quality Computers	2,3,4, 5,
7	Ramco Computer Supplies	69
9	Recycled Paper Co	66
33	Remarkable Products	23
90	Roger Coats	21
41	Scholastic	39
29	Shreve Systems	69
291	Softdisk	1
127	SoftSpoken, Inc.	66
86	Software of the Month Club	68
23	Software of the Month Club	67
18	Sports Software Assoc.	68
60/3	Spring Branch Software, Inc.	68
36	Sun Remarketing	67
25	Symantic	6
6	The AppleWorks Educator	69
56	TMS Peripherals,Inc	CV3
231	Tulin Corp	63
297	USA Micro	54
*	Utilico	67
17	VMC Marketing	69
99	Westcode Software	19
189	Zip Technology	CV2
26	Zuhyde Intelligent Computers	67

GET THE POWER OF APPLEWORKS GS WORKING FOR YOU!

Improve your personal productivity while you become an AppleWorks pro with AppleWorks GS Productivity Paks.* Created by Cynthia E. Field, *inCider/A+'s* "Press Room" columnist, these ready-to-use template collections are available only through *inCider/A+*.

With each Productivity Pak you get ten ready-to-use templates to make easy work of your home, business, and school projects! Each project includes a blank template and a completed sample to use as a model. Plus, you get an extensive manual to guide you step-by-step through each project.

JUST $29.95 each!
That's less than $3 per template!

AppleWorks GS Productivity Pak I

MEMO PADS
MEMBERSHIP
NAME BADGES
MERGE DOCUMENT
AUTO MILEAGE LOG
RESUME
NUTRIDATA
CHECKBOOK
BUDGET
NEWSLETTER

AppleWorks GS Productivity Pak II

LIVING WILL
FAMILY TREE
BOOKLET
HOME BUYER'S GUIDE
VIDEOTAPE LIBRARY
CUSTOM CALENDARS
INCOME TAXES
COOKBOOK
CAR-COST COMPARISON
COLLEGE GUIDE

Buy both volumes for just $49.90 and SAVE $10

Canadian orders: add 7% GST. Foreign air mail: add $3.95. Foreign orders must be paid in U.S. funds drawn on a U.S. bank.

* Require AppleWorks GS v. 1.1. AppleWorks is a registered trademark of Apple Computer, Inc., licensed to Claris Corporation.

CALL TOLL-FREE 1-800-343-0728
(In NH: 924-0100)

inCider/A+ Special Products
80 Elm Street
Peterborough, NH 03458

HIA1C

MAR KET PLACE

RECYCLED PAPER

for Office and Home
Save Trees, Water, Energy and Landfill Space

• 20# Premium White •
• 50% Recycled Fibers •
• 10% Post-Consumer Fibers •

Tractor-feed, Clean-edge Computer Paper
Box of 1000 9.5" x 11" • $12.50 + $5.00 S/H
Box of 500 9.5" x 11" • $ 8.50 + $4.00 S/H

High-Speed Xerographic Paper for Copiers & Laser Printers
500 Sheets 8.5" x 11" • $5.00 + $4.00 S/H
500 Sheets 8.5" x 14" • $6.00 + $4.00 S/H

Continental U.S. Only •Send Check or Money Order to:

Recycled Paper Company
P.O. Box 3597, Quincy, CA 95971

Circle 9 on Reader Service Card.

!!!REPAIRS!!!

Apple II+, IIe, IIc
Logic Board swap $125 + S&H
Mac+, SE Logic Board swap $225 +S&H
ONE YEAR WARRANTY
Apple 5.25" DD Rehab $75 + S&H
Apple 3.5" DD Rehab $150 + S&H
Mac+, SE Power supply swap $100+S&H
Call for more information!
We buy dead Apple, Mac, and PCs

Arminius Pubs. and Prods. Inc.
8519 Orchard Avenue
Merchantville, NJ 08109
(609) 662-3420

Circle 64 on Reader Service Card.



New Software for IIe, IIc, IIgs

Apex

- **FRACTAL FINDER** – Combine science, math and art to create fantastic color images. Includes magnifier, detail enhancer, quick-look and image colorizer. IIgs version includes kinematic effects.
- **APEX BUILDER** – Write graphics desktop applications on your IIe, IIc, or IIgs. More than 200 commands plus rare double-HIRES color graphics.

My computer has 128K memory.
Send 5¼" disk with:

- ❑ **Fractal Finder** (IIc, IIe, IIgs) .....$ 9.95
- ❑ **Fractal Finder** (for IIgs).....$14.95
- ❑ **Apex Builder** (disk&manual) $39.95

NAME

ADDRESS

CITY / STATE / ZIP

☐ IIe ☐ IIc ☐ IIgs ☐ Laser 128K

Enclose cash, check, or money order. (Add $5 for 3.5" samples disk. Overseas – add $5 for air delivery.)

MAIL TO:
MICROGRAM SYSTEMS
P.O. Box 252, La Honda, CA 94020-0252
Tel.: (415) 747-0811

IIgs is a trademark of Apple Computer, Inc.

Circle 13 on Reader Service Card.

SOFTWARE CLOSEOUTS
For Apple & Macintosh

INFOCOM BARGAINS FOR APPLE ..... $5 each
Wishbringer, Leather Goddesses of Phobos, Beyond Zork, Zork Zero, Planetfall, Mines of Titan, Shogun, Lane Mastodon or Gamma Force.
ACCOLADE BARGAINS FOR APPLE ..... $5 each
Hardball, Comics, Dambusters, Sundog or Law of the West.

SPECIAL BUNDLE FOR APPLE IIgs ..... ONLY $10!!!
LIST PLUS & TELEWORKS PLUS, by Activision

SPECIAL BUNDLE FOR MACINTOSH ..... ONLY $10!!!
BUSINESS CLASS & CITY TO CITY, by Activision

AVALON-HILL SPECIAL PURCHASE FOR APPLE . . . . . .$10 each
Beast War, Darkhorn, Dr. Ruth, Dreadnoughts, Super Sunday, Mission on Thunderhead, Parthian Kings, Police Blotter, Under Fire, T.A.C. or Tsushima.

SPECIAL DEALS FOR APPLE

Arthur: The Quest for Excalibur, by Infocom	$14.50
A Mind Forever Voyaging, by Infocom	$14.50
Maniac Mansion, by Activision	$14.50
President Elect, by SSI	$9.50
Epidemic, by SSI	$9.50

SPECIAL DEALS FOR APPLE IIgs

The Graphics Studio, by Accolade	$14.50
Writer's Choice Elite, by Activision	$19.50

TO ORDER, SEND CHECK OR MONEY ORDER TO:
COMPSULT
DRAWER 5160, SAN LUIS OBISPO, CA 93403-5160
Include $4 for shipping charges in U.S., $8 for Canada, $12 for Int'l., CA addresses add 7.25 % tax.
1-800-676-6616
CREDIT CARD ORDERS ONLY, PLEASE!!! $25 Minimum
To receive a complete catalog of over 2,000 closeout items for all computer types, send $2 in cash or postage stamps to the above address. The catalog is FREE with any order! To check for an item not listed, or any other questions, call (805) 544-6616.
WE ALSO CARRY SOFTWARE FOR IBM, COMMODORE 64/128, AMIGA, ATARI & MORE!!

Circle 11 on Reader Service Card.

RIBBONS

1-800-331-6841
1-513-252-1247
FAX 513-252-4429
Over 350 types
Volume Discounts Available
*** * Satisfaction Guaranteed * ***

	BLACK	COLORS
APPLE IMAGEWRITER	2.40	2.95
APPLE 4-COLOR	-	5.50
APPLE SCRIBE	5.95	-
CITIZEN 200GX/GSX-140	3.50	13.50
EPSON LX-80/90	2.10	3.50
EPSON MX-FX 80	2.50	4.50
EPSON MX-FX 100	3.50	4.50
IBM PROPRINTER	3.50	-
OKIDATA 182-192	3.50	4.50
PANASONIC 1080	3.50	4.50
PANASONIC 1124	4.95	4.50
STAR NX-1000	3.25	3.95
NX-1000 4 COLOR	-	7.50

DAYTON COMPUTER SUPPLY
a division of Den-Sys Corp
1220 Wayne Avenue, Dayton, Ohio 45410
Est:1979 TERMS: C.O.D., MC, VISA, DISCOVER, AMEX.
Fullmark® brand ribbons

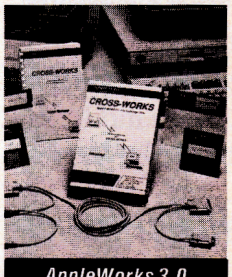
APPLEWORKS ⇔ IBM

CROSS-WORKS 2.0 can exchange AppleWorks data files with the most popular MS-DOS programs:

NEW!

AppleWorks ⇔ Microsoft Works
AppleWorks Word Proc. ⇔ WordPerfect
AppleWorks Spreadsheet ⇔ Lotus 1-2-3
AppleWorks Data Base ⇔ dBase III, IV, etc.

In seconds, ***CROSS-WORKS*** copies files either way between your Apple *II* and IBM PC, and translates the file formats. Word Processor files maintain underlining, margins, centering, etc. Spreadsheets transfer data **and** formulas! Transfers ASCII text files too. **Includes universal 19,200 baud cable** to connect ***IIe*** (with Super Serial Card), ***IIc, IIcPlus*** & ***IIgs*** to PC, XT, AT, PS/2 & compatibles. Also supports modem transfers. Both 5¼ **and** 3½ inch disks included.



AppleWorks 3.0 Compatible!

*"...Look no further. SoftSpoken's CROSS-WORKS carries the biggest stick in the file translation/transportation business... **Rating:** ★★★★" — **InCider** July, 1989*

CROSS-WORKS™ $99.95 + Shipping & Hand.
30 Day money-back guarantee! School P.O.s welcome.
☎ **(919) 870-5694** for free information.

***Soft*Spoken**
P.O. Box 18343
Raleigh, NC 27619

Circle 127 on Reader Service Card.

Unleash the Hidden Audio Powers of Your Apple //

The Shan's Digicorder (D.C.R) allows any Apple // (+, e, c, GS)or compatible to play real world sounds, like natural human speech in any language, multi-timbral poly-phonic music etc., through your Apple's built-in speaker, with out requiring any additional hardware. You can easily create (Digitize) sounds , using its graphic user interface. Later you can play them back with or w/o special-fx like Flange, Mix, reverse and more from your own Basic / M.L programs. *Your programs with the sounds may be distributed on disk, without paying any cash royalties, so that it may run on any Apple.*

Just US$ 49.95 (incl: Air Mail). Demo disk for $4 (fully refundable when your order). Free catalog. *ORDER NOW AND GET DCR (FREE GIFTS TOO) FOR ONLY $39.95 (add $5.00 for shipping).*

And now, to introduce you to the D.C.R (and to us) take part in the ***Cybergenesis-Sweepstakes***. 1000s of prizes with a trip for 2 to India as Ist prize. Every contestant is a winner, as they will recieve a free custom printed shirt (not a T-Shirt).

Usergroups, Dealers and Educational Users, Write E.M.I. on our exclusive offers for you.

Entry forms inside every D.C.R pack. For more details, contact your dealer or write to us. HURRY! contest closes 15th Nov, 1991.

Zuingle Cybergenesis

Vatanappally - 680614 Kerala India

Circle 26 on Reader Service Card.

BACK UP YOUR DISKS

When one of your favorite disks "crash" and the software publisher is out of business, all is lost—unless you've made a back up copy. With **Essential Data Duplicator 4.9 PLUS** you can back up your uncopyable "copy-protected" 5.25 inch disks . . . before it's too late!

EDD 4.9 PLUS copy system uses a special interface card for accurately backing up more disks than all copy programs together, guaranteed! In addition, we've included several useful utilities.

EDD 4.9 PLUS runs on apple compatibles, II+, IIe, and IIgs; price, **$129.95**. *Daisy chain type or duodisk drives need $15 cable adapter.* Add $5 shipping ($8 foreign).

A software only version, **EDD 4.9 standard**, runs on apple compatibles, II+, IIe, IIc, IIgs, and IIi; price, **$29.95**. Add $3 shipping ($6 foreign).

No risk — If unhappy for any reason, return in 30 days for refund.

If you already own **EDD**, please pass this message to a friend.

Phone orders (707)965-2290 weekday mornings (P.S.T.). M/C, Visa accepted. Or, send orders to: **UTILICO**, 3377 Solano Ave., Suite 352, Napa, CA 94558. **EDD** is also available through your favorite software dealer.

ESSENTIAL DATA DUPLICATOR

Who Helps Apple II Pros...

Get quick answers to tough coding questions

Interact with other Apple II developers

Download source code, utilities and other programs

Keep up with the latest Apple II developments

Send and receive private e-mail with binary attachments

Chat with other Apple II developers in real time

BIX

The on-line service for people who know the Apple II.

Call us to find out how you can subscribe!
800-227-2983 or 603-924-7681

Circle 34 on Reader Service Card.

Cheap Buys

Macintosh		Apple //	
Mac Plus	$595	Apple //e	$199
Mac Plus/40mb	$995	Apple //c	$249
Mac SE	$895	Disk //	$79

Apple // Software		Accounting	
Catalyst //e	$49	BPI GL	$39
Word Juggler //e	$49	BPI AR	$39
Terminus //e	$29	BPI AP	$39
Legal Dictionary	$29	Additional Module	$39

Many more items in our complete catalog.

All computers are reconditioned and come with a 30-day money-back guarantee and a 90-day parts and labor warranty. Call for specific details.

Call 24 hrs. a day for free catalog.

Sun Remarketing, Inc.

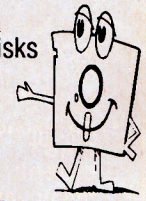
1-800-821-3221

Sun Remarketing, PO Box 4059, Logan, UT 84321

Circle 36 on Reader Service Card.

FREE -15 DISKS - FREE FULL OF SOFTWARE FOR KIDS

TRY US! Get our bestselling **VIRUS FREE** software for kids. 15/5.25" disks or 6/3.5" disks for Apple]]®,Apple GS®, or Mac®. Great Games, Puzzles, and Tutorials. Credit cards only!



PAY ONLY $5.00 FOR SHIPPING
satisfaction guaranteed

MACINTOSH® •APPLE][®•APPLE GS®

SMC SOFTWARE PUBLISHERS
ORDER TODAY - CALL
619 931-8111
since 1985

VISA MasterCard

Circle 23 on Reader Service Card.

Learning Fast is a Blast! NEW!

Kids have fun drawing and learning:



- ▶concepts of up,down,left,right
- ▶shapes,letters,colors,numbers
- ▶reading & math logic
- ▶beautiful drawings & designs



For all Apple II & IIGS, and compatibles

FREE Demo Disk!
800-395-5009

Delta Drawing®

Software for Exploration and Discovery Today

Delta Drawing is a Trademark of Power Industries LP. © Power Industries LP. All Rights reserved.

Circle 121 on Reader Service Card.

ComputerWorks



$199

LASER 128 Factory Reconditioned Full One Year Warranty

We stock the entire line of Laser Computers, Drives, Cards, RAM, Monitors, Printers, Modems, Cables, and more!!!

Laser 128	$289	5 1/4" Drive	$89
Laser 128EX	$359	IIe Ext. 80 Col.	$29
Mono Monitor	$99	IIe Par. Card	$29
Color Monitor	$179	IIe Serial Card	$49

LASERS' LARGEST "FACTORY AUTHORIZED" SERVICE CENTER

Credit Cards Accepted • School PO's Accepted

Call Toll Free Order Line

1-800-969-6757

4544 Memorial Drive, Suite 302
Decatur, Georgia 30032

Circle 8 on Reader Service Card.

Bible Software

Find any verse in the Bible, search for any word or phrase. Easily find the exact verse you need for your study. Build personal condcordances to the Bible. We also offer a topical index and a Greek transliterator. For ProDos, Macintosh & MSDOS. Call for a **FREE** brochure.

(800) 423-1228

Bible Research Systems

2013 Wells Branch Pkwy #304
Austin, Texas 78728
(512) 251-7541

Circle 87 on Reader Service Card.

FREE -15 DISKS - FREE FULL OF GREAT SOFTWARE

TRY US! Get our bestselling **VIRUS FREE** software.15/5.25" disks or 6/3.5" disks for Apple][Apple GS or Mac. Games Business, Graphics, Education Utilities, Finance, and Desktop publishing. Credit cards only!



PAY ONLY $5.00 FOR SHIPPING
satisfaction guaranteed

MACINTOSH® •APPLE][®•APPLE GS®

SMC SOFTWARE PUBLISHERS
ORDER TODAY - CALL
VISA **619 931-8111** MasterCard
since 1985

Circle 86 on Reader Service Card.

LASER 128 Apple Compatibles

	Computer	w/Amber	w/Color
128	289	378	489
128EX	359	448	559

New - LASER PC-4 Portable for Macintosh....222

Largest LASER Repair Center and Educational Dealer in Southeast.

Amber Monitor.....95
Kraft KC-3 Joystick...25
Zoom 2400 Modem.....89
Mouse for Laser or IIc.....45
LASER Expansion Box...55 Cap...23
UDC card: connect 3.5 Drive to Apple IIe...45
Safeskin Keyboard Protector for Laser or Apple....20
LASER 3.5 Daisy Drive...159 LASER 3.5 Drive...119
LASER 5.25 Daisy Drive...95 LASER 5.25 Drive...89
LASER 14" RGB color + green + tilt & swivel.....215
Magnavox Color for IIe.....288 RGB for IIgs.....308
IIe Printer Card w/cable: Parallel...45 Super Serial...62

New **- LASER 192A** for IIe/gs/c/c+, Mac, Laser...189
ImageWriter Compatible Serial Printer

LASER *Experts* **1-800-726-7086**

Memory 128K Card for IIe...25
Chips for IIgs: 1 meg...49 for Laser & Apple: 256K...18
RAM Card for IIe...52 IIgs...59 IIc...69 Laser 128...25

Perfect Solutions (407) 790-1070
12657 Coral Breeze Dr, W. Palm Bch, FL 33414

Circle 59 on Reader Service Card.

OMNISHORE ELECTRONICS MFG. CORP.

- A quality source of your external SCSI hard disks, tape backups, and combo units. Apple, Mac, IBM compatible.
- An exclusive manufacturer of all FIRST CLASS PERIPHERAL SIDERS. Also provide service, repair, and upgrade on existing models.
- See our AD in the upcoming issues of this magazine.

1700 Forrest Way
Carson City, NV 89706
Sales: 800-982-3232
Tech Spt: 702-687-2800

• PLEASE MENTION THIS AD •

Circle 16 on Reader Service Card.

DUST COVERS

Gray Tan
Navy Red
Royal Brown



100% Fabric Dust Covers

- Heat Ventilating, Unlike plastic, and Won't Dry Out, Yellow or Crack with age! • Machine Wash & Dry!
- Highest Quality, Custom-Fit Designs! • For Apple, MAC, IBM, Compaq & many more! • Custom orders!
- Monogramming and Silk-screening Available!
- 100% Satisfaction Guarantee! • Service since 1983!

10-62 IIgs, RGB Mon & Kbd.	29.95	95-24 Laser 128 CPU	15.95
10-87 IIgs, KSS, RGB & Kbd.	29.95	10-60 Apple 3.5" Drive	6.95
10-96 IIgs, RGB & Kbd (3 pc).	34.95	10-38 Apple 5.25" Drive	6.95
10-67 IIgs Keyboard Only	6.95	10-59 3.5" on top 5.25"	9.95
10-16 IIc & Monitor IIc	24.95	11-30 Mac Classic & Kybd	24.95
10-61 IIc & Color Mon IIc	29.95	11-32 MacLC,12" Mtr & Kyb.	29.95
10-17 IIc External Drive	6.95	11-36 Mac IIsi,13" Mtr & Kyb.	29.95
10-58 IIe & IIe Color Monitor.	29.95	10-37 Imagewriter II	15.95
10-34 IIe Computer Only	15.95	10-90 LaserWriter II	24.95
10-32 IIe Color Monitor Only.	19.95	11-25 Personal LaserWriter	24.95
10-07 IIe & IIe Mono Monitor.	24.95	11-52 Stylewriter	15.95

Add $4.00 Shipping & Handling (Check, MO, COD, VISA/MC)

CO-DU-CO Computer Dust Covers
4802 W. Wisconsin Ave., Milwaukee, WI 53208
800-735-1584 • 414-476-1584 • 414-476-9329 FAX

Circle 21 on Reader Service Card.

Sports Scheduler

THE BEST MOST COMPLETE LEAGUE PLAY SCHEDULING SOFTWARE ON THE MARKET.

- Schedule any number of leagues, categories or divisions with 4 to 22 teams in each.
- The date, day, time, location, game number, & home & visitor are calculated for every game.
- Equal distribution of; opponents, teams playing in time slots, byes for odd number of teams, home and visitor status, and the number of games.
- Games are listed in chronological order by date and time arranged in sets and round robins.
- Only minutes to create/print/save a schedule.
- Saved schedules can be recalled into APPLEWORKS providing unlimited editing and printing options. You select desired file format- word processor, spreadsheet,or data base.
- Prints mailing labels and league/team contact rosters for each league, category or division.
- Create scheduling organization/setup worksheets.

Bonus- Referee/ Facility Scheduler included free.
Apple IIe,c,IIgs (5¼ disk) $109.95+$3.00 S&H
IBM PC & Comp (3½ or 5¼ disk) $129.95+$3.00 S&H
Call or write for informative brochure:

SPORTS SOFTWARE ASSOCIATES
P.O.BOX 458, HINGHAM, MA 02043
(617) 749-7880

Circle 18 on Reader Service Card.

AW Enhancements – Best Prices

Companion Plus	$29.99	QuickSpell	$39.99
DeskTools	29.99	ReportWriter	45.99
DeskTools II	29.99	SideSpread	29.99
FileMaster	29.99	SpreadTools	35.99
GS Font Editor	29.99	SuperFonts	39.99
Graph	50.99	SF Activity Guide	29.99
InWords	77.99	SuperForms	39.99
MacroEase	23.99	TeleComm	39.99
Outliner	39.99	Thesaurus	29.99
Point-to-Point	59.99	TextTools	29.99
PowerPack	29.99	UltraMacros	35.99

*Shipping: $3.50 for first product. $1.50 for each additional product. Prices in U.S. dollars. **NAUG** accepts Visa/MC. Foreign orders by credit card only. Foreign postage additional. Satisfaction guaranteed or your money back.*

Mail to: National AppleWorks Users Group
Box 87453, Canton, MI 48187; (313) 454-1115.

Circle 55 on Reader Service Card.

2 POWERFUL SOFTWARE PROGRAMS from Spring Branch™

COMPLETE MATHEMATICAL PROGRAMS for HIGH SCHOOL and UNIVERSITY STUDENTS or WORKING PROFESSIONALS

GSNumerics
for the APPLE IIGS COMPUTER

- SCIENTIFIC CALCULATOR •Atomic Weight & Number. •196 Unit Conversions. •Automatic Function Parsing. •Complex Math. •64 Functions.
- POLYNOMIAL & NON-POLYNOMIAL OPERATIONS •Solve for y. •Slope. •Area. •Roots. •Integrate & Differentiate Polynomials.
- x-y REGRESSION •Linear. •Log. •Exponential. •Power.
- SYSTEMS OF LINEAR EQUATIONS •Real or Complex, up to 10 x 10.
- MATRIX OPERATIONS •Add. •Subtract. •Multiply. •Scalar Multiplication. •Transpose. •Inversion. •Determinant. •Real or Complex up to 10 x 10.
- COMPLETE FILE OPERATIONS
- GRAPHICS •Polynomials. •Non-polynomials. •x-y Data. •Regressions. •Graph Magnification. •Overlay Two Functions. •Overlay Function and Derivative. •Overlay Function and Integral.

Circle 60 on Reader Service Card.

NEW

MacNumerics
for the Macintosh Computer

The NEW MacNumerics has all the basic functions and features of GSNumerics PLUS...

- POLYNOMIAL OPERATIONS •Enter In Polynomial Form. •Enter In Factored Form. •Enter As A Factor Power Expansion. •Factor Polynomials With Real And Complex Factors.
- GRAPHICS •Compute And Display Real Roots. •Compute And Display Area Between Two Points. •Compute And Display Common Solutions. •Compute And Display Area Between Two Functions.
- SHOW COMPUTATION STEPS

TWO POWERFUL TOOLS FOR TEACHING AT THE HIGH SCHOOL & UNIVERSITY LEVELS

For complete information contact:

Spring Branch Software, Inc.
P.O. Box 342 • Manchester, IA 52057
Phone: (319) 927-6537

Circle 3 on Reader Service Card.

inCider/A+ brings you great new projects for AppleWorks 3.0!

APPLEWORKS 3.0 PRODUCTIVITY PAKS

The AppleWorks 3.0 Productivity Pak series was created by Cynthia Field, inCider/A+'s "Press Room" columnist. These outstanding collections will improve your personal productivity while helping you become an AppleWorks 3.0 pro!

With each Productivity Pak you get ten ready-to-use templates to make easy work of your home, business, and school projects! Each project includes a blank template and a completed sample to use as a model. Plus, you get an extensive manual to guide you step- by- step through each project.

Look at these exciting applications:

AppleWorks 3.0 Productivity Pak I*

Inventory Organizer • Desktop Publisher
Auto-Mileage Log • Membership Organizer
Statements • Mail-Merge Postcard
Checkbook Manager • Nutridata
Nutricalc • Home Construction

AppleWorks 3.0 Productivity Pak II*

Family Tree • Videotape Library • Living Will
Car Cost Comparison • Custom Calendar
Home Buyer's Guide • Cookbook
Booklet • College Guide • Income Taxes

Only $29.95 each!

Special Offer!

Save $10

when you buy BOTH for just $49.90

Foreign Airmail, add $3.95. Foreign orders must be paid in U.S. funds drawn on a U.S. bank. Canadian orders add 7% GST.

* Requires AppleWorks 3.0. AppleWorks is a registered trademark of Apple Computer, Inc.,licensed to Claris Corporation.

inCider/A+ Special Products
80 Elm Street, Peterborough, NH 03458

TOLL-FREE: 1-800-343-0728
In NH: 924-0100 Fax: 603-924-9384
HIA1D

Back Issues

Back issues of inCider/A+ can be purchased, subject to availability, for $4.50 per issue plus shipping (1-9 copies, add $1 per issue: 10+ copies,add $7.50 per order).All foreign orders must be paid in U.S.funds drawn on a U.S. bank. Currently, most issues from 1988 to present are in stock. If you wish to purchase back issues, send in a written request with a check, money order, or credit card information to:

inCider/A+ Back Issues,
80 Elm Street, Peterborough, N.H. 03458.
Or you may charge your order to your credit card by calling 1-800-343-0728 (in NH:924-0100)

We Trade!

Mac LC 2/40 $1795.

Parts

Repair-Upgrade

Apple II, Macintosh & IBM PS/2

Shreve Systems



3804 Karen Lane
Bossier City, La. 71112 FAX 318-742-2799

800-227-3971

School & Government P.O.'s accepted!

Circle 29 on Reader Service Card.

APPLE MEMORY CHIPS

Guaranteed Lowest Price!

★ 1MB SIMM (ALL MACS)	$45.00
★ 256K Chip Set (Standard)	$19.00
★ 256KX4 Chip Set (AE Ultra)	$14.95
★1MB Chip Set (AE Plus)	$55.00
★ SE 4 MB card for IIGS w/1MB	$99.00
★ SE 1 MB card for IIc w/256K	$105.00
★ SE 1 MB card for IIE w/256K	$99.00

All type chips available, call for details.

CALL TOLL-FREE 1-800-776-6260



VISA MasterCard COD

1854 S.Stewart
Springfield, MO 65804
Phone: (417) 883-6261
FAX: (417) 883-2584

Circle 17 on Reader Service Card.

Hard Drives!

"Frog Systems . . . manages to combine a competitively low price with high-quality performance"
MacUser (UK, 6-28-91)

Model	Capacity	Price
Frog 20e	20MB	$189
Frog 45e	45 MB	$279
Frog 65e	70 MB	$299
Frog 100e	105 MB	$359

Brand-New, External Apple II SCSI Drives
30-Days Money Back Guarantee • 1 & 2 Year Warranties
Visa • MasterCard • Federal Express

Call Now!

Frog Systems, Inc.
4301 Oak Circle #20, Boca Raton, FL 33313

800-654-FROG

Circle 24 on Reader Service Card.

COLOR RIBBONS & PAPER

Colors: Black, Red, Blue, Green, Brown, Purple, Yellow

Ribbons: price each	Black	Color	T-Shirt Ribbns
Apple Image, I, & II	$3.75	$4.50	$6.50
Apple Image, II 4-Color		$5.95	$10.00
CitizenGSX140	$4.00	$5.00	$7.50
CitizenGSX140, 4-Color		$13.25	$18.00
Epson MX-80	$3.75	$4.50	$6.75
Okidata 182/192	$5.00	$7.50	
Panasonic 1180/1124	$5.00	$7.50	
Star NX 1000	$3.50	$4.50	$6.75
Star NX 1000, 4-color		$6.25	$10.00

T-Shirt (Heat Transfer) Ribbons
Colors: Black, Red, Blue, Green, Brown, Purple, Yellow

COLOR PAPER

Color Paper:	200 Shts assorted	
Bright Pack:	9½ x 11	$10.90/pk
Pastel Pack :	9½ x 11	$7.90/pk
Color Certificate Paper:	100 sheets	$9.95/pk
Color Banner Paper:	45 ft/roll	$8.95/roll
Holiday Paper:	50 sheets	$6.90/pk

Min. orders: $25.00. Minimum S&H: $4.50. Call for other ribbons and supplies. Price and spec. are subject to change w/o notice.

RAMCO COMPUTER SUPPLIES
P.O.Box 475, Manteno, IL 60950 U.S.A
USA 800-522-6922 or USA 815-468-8081(Canada) 800-621-5444

Circle 7 on Reader Service Card.

THE APPLEWORKS EDUCATOR

***The only publication* devoted exclusively to educational AppleWorks users.**

The AppleWorks Educator will help you:

- Learn new tricks and techniques for AppleWorks "classic," AppleWorks GS, and add-ons from Beagle Bros' TimeOut series.
- Save time and find inspiration through exclusive news updates and reviews of new AppleWorks educational resources.
- Work quicker and more productively using AppleWorks for material preparation, student tracking and report generation.
- Make your classroom more dynamic and "hands-on" through thoughtful computer integration at whatever grade or discipline.
- Find relevant advice whether you are an AppleWorks novice or school expert.
- Save money through our subscriber discounts on many educational AppleWorks materials.

Bimonthly publication entering its sixth year – plus new yearly template and file disk with summer issue

Subscriber Options:

- **Level 1** - Subscription (includes yearly template disk) $25 for one year or $48 for two years.
- **Level 2 - Extra Value and Savings**

Subscription (including yearly template disk) + **Bonus** Teacher Resource Disk (double sided, filled with useful sample, resource and tip files) $34.95 for one year (over $3 savings) or $57.95 for two years.

Add $3 billing charge for Purchase Orders without payment. Canada/Mexico add $3/yr. postage, foreign air mail $15/yr (US funds on US bank).

Check and money orders to **The AppleWorks Educator**, P. O. Box 72N, Leetsdale, PA 15056, (412) 741-4110. **SATISFACTION GUARANTEED!!**

Circle 6 on Reader Service Card.

BATTERIES

Your IIGS Out of Time?
Slide-On™ Battery Replacement Kit will save your Apple IIGS computer!

- Fantastic Savings
- Easy installation
- No Solder Required
- Complete Instructions
- Heavy Duty Lithium Battery
- 10 Year Shelf Life
- Satisfaction Guaranteed

$14.95 each Kit or $120 for 10 Kits
Send Cash, Check, MO, or School P.O..
Add $2 S/H per order (Overseas $5)
KS residents 6% tax. VISA/MC.
Patent pending

FAX: (913) 362-5798
Nite Owl Productions
Slide-On Battery Dept.
5734 Lamar Street
Mission, KS 66202
(913) 362-9898

COMPUTERS & SUPPLIES

SUPER DEALS ON
MACS & APPLES!
BUY SELL ** TRADE**
USED ** NEW

Apple IIc/IIc+,IIe	Lowest
Apple IIgs 1.25 Meg	$599.99
•MAC PLUS 2.5/40 EXT HD	$849.99
•MAC SE 2.5/20 EKB	$1049.99
•MAC Classic 2.5/52(new)	$1199.99
•MAC II 2/40 EKB	$1999.99
•MAC SE/30, IIcx, IIci, IIfx	Lowest
•MAC LC,IIsi, Portable	Call
Imagewriter I/II from	$249.99
Apple 3.5" Unidisk 800K	$269.99
Mice/Apple HI-Speed SCSI	$59.99-99.99
Quantum 40/80 Meg HD (new)	$340-$475
Classic Upgrade Kits 2.5/40	$279.99
Memory /Cards	Lowest
Floppy Drives	Call
Parts, Peripherals, Repairs	Lowest

Also open evenings & weekends

M.P.-Computer Micro Systems
655 W. Evelyn Avenue #2
Mountain View, CA 94041
(415) 960- 1514 (VOICE)
(415) 968-0509 (FAX)

FACTORY FRESH RIBBONS

Ribbon	Black	Color
Apple Imagewriter I,II	$ 2.25	$ 2.95
Imagewriter II 4 color		$ 4.95
Imagewriter II 4 color Heat transfer		$ 9.95
Imagewriter LQ (Black and 4C)	$ 8.95	$13.95
Panasonic 1124	$ 3.50	
Epson MX/FX/RX80	$ 2.50	$ 3.50
Epson MX/FX/RX100	$ 3.50	$ 4.00
Star NX1000	$ 3.25	$ 3.95

For Orders of less than 6, please add .75¢ each.
Hundreds more.
Colors (BLUE, RED, GREEN, PURPLE,)
-PREMIUM IS ALL WE SELL!
Shipping/Handling $3.75 per order (over $75 we pay S/H).
AK,HI,P.R.,APO/FPO, Canada add $6. S/H to all orders
Free box of 10 diskettes with orders over $100.00 (specify 5.25 or 3.50). New York residents please add sales tax.
School, hospital and govt. PO's welcome.
-MONEY BACK GUARANTEE

ISLAND COMPUTER SUPPLY
305 Grand Boulevard
Massapequa Park, New York 11762
(516) 798-6500

ENTERTAINMENT

HAVE YOU WON THE LOTTERY?
DO YOU OWN LOTTO PICKER™ ?
WELL, WHAT DID YOU EXPECT!
LOTTO PICKER for Apple II is a must purchase if you are SERIOUS about winning larger jackpots and generating more frequent smaller winnings on a routine basis! LOTTO PICKER works by uncovering hidden biases in your lottery game and exploiting them in order to provide you with qualified plays to make. Your card will be loaded with numbers that have proven to be statistically significant for your lottery game. Works for all lotteries worldwide (including daily number games). *NEW LOW PRICE* $29.95 (+$4.55 s/h)
SATISFACTION GUARANTEED!
ORDERS: 1-800-484-1062 s-code 0644
or 1-718-317-1961
GE RIDGE SERVICES, INC.
170 Broadway, Suite 201-IC,
New York, N.Y. 10038

PUBLIC DOMAIN

APPLE PUBLIC DOMAIN DISKS
Request free catalog or send $2 for sample disk & catalog (REFUNDABLE). Categories include education, utilities, games, business, Print Shop graphics, shareware, EAMON and more. Buy as low as $1.00 per disk. A $20 order gets 4 free disks of your choice. NEXT DAY SHIPPING! We have been distributing Public Domain programs since 1986 and will continue to provide timely, courteous responses to all inquiries. Purchase Orders welcomed! VISA/MC accepted.

CALOKE INDUSTRIES (DEPT. SK)
P.O.Box 18477
Raytown, Mo 64133

BEST BUYS IN APPLE II SOFTWARE
Choose from over 850 organised SHAREWARE & Public Domain disks. (No repeats) We specialize in EAMON adventures (continuously updated) and 1000's of PRINT SHOP graphics, borders and fonts, pictured in catalog. Also: APPLEWORKS files, UTILITIES, TEACHER AND SCHOOL, GAMES, and much more. Our disk are $1.00 each. No membership fee. MC/VISA honored. 24hr phone line. Greatest satisfaction! 4th year of business. Member EAG since 1/89. Write or call for FREE categorized 30 pg catalog. (Free disks for limited time.)
CONTINENTAL SOFTWARE COMPANY
PO Box 1511
So. Glens Falls, NY 12803
518-761-6117

FREE APPLE PUBLIC DOMAIN CATALOG
Request free catalog containing complete description of hundreds of programs for the Apple II+, e, c, c+, and GS computers. We carry the very best in all categories including Business, Home, Education, Utilities, Games, Print Shop Graphics, Appleworks Templates, and more. We use only high-quality colored disks which are completely SELF-BOOTING and MENU-DRIVEN. All orders are shipped the same day they are received. We pay shipping with small minimum order. Request free catalog or send $2.00 for catalog and demo disk. Money-Back Guarantee! Send for yours today!
MOONLIGHT SOFTWARE
P.O.Box 179144
San Diego, CA 92177

BEST VALUE IN
APPLE PUBLIC DOMAIN
NOW ACCEPTING MC/VISA!
Largest selection available, over 1200 disks, packed, organized and MENU-DRIVEN with only the best PD and Shareware. Our library is continually updated and includes many of the latest releases for the Apple IIGS! We emphasize quality and service with NEXT DAY shipping available. All categories (Utilities, Education, Business, Games, PRINTSHOP GRAPHICS, Religion, Appleworks templates, Pascal, Ea-mon, and more). Programs available in 5.25 and 3.5 format. No membership fee! Send $2.00 for a descriptive catalog and demo disk to:
CHRISTELLA ENTERPRISE
P.O. Box 483
St. Clair Shores, Michigan 48080

MUSIC

ELECTRONIC MUSIC
MIDI PRODUCTS
New Release: MidiMate software-MIDI utility for SynthLab $49, and SysEX-GS system exclusive software $34. Turn an Apple II or Mac into an 8- track or 64-track MIDI Music studio with sequencing software using step/real time recording, auto correct, editing functions and graphics: Passport MasterTracks Jr. GS $99, MT PRO GS $299, Dr T's KCS V 2.0 IIe, II+ $155, Glasstracks IIe, II+, GS $88, Super Sequencer IIe, II+,GS $155. GS/Mac/IIe/II+ STARTER PACK: MIDI Software + MIDI interface + cables $159. Mac software: Trax $79, EZVision $109, Vision $349, MiBac Jazz $109, Band in a Box w/styles $79, PRO 4 $339, Beyond $249. Hardware + Software Packages Available: Music Writer GS/Mac-3 staffs $79, 8 staffs $197, 40 staffs $385 or IIe MusicWriter 4 staffs $195 or 30 staffs $385, Encore Notation + MIDI + 2-6' cables Mac $399, IIe $259, GS or Mac $158. Connect your Apple II/Mac to MIDI Keyboards: Apple II+, IIe MIDI snap-in card 1x2 channels $79, GS/Mac 1x3 $69 or with serial Thru switch and Diode MIDI Signals $89.2x6 studio $169, MIDI books $2.50 S/H each: A Guide to Computer Music $16.95, Music and the Mac $16.95,Music and Technology $19.95, Electronic Music Dictionary $15.95,Casio Insider's Guide $16.95. Learn and practice music at home for children and adults MIDI and nonMIDI software: Keybrd Tutor $38, Chords $78, Fingering $78, Note Reading $38, intervals $78, Note Detective $88, Early Music Skills $38, Musical Stairs $38, Instant Keyboard Fun $38, Black molded MIDI cables:6'6.95, 10'7.95, and up to 50' available. Amazing multi-timbral MIDI Keyboards only $369-$999. Studio or

classroom MIDI Reference Poster $14 + $5.50 S+H. All MIDI software/hardware, music ed. and band charting aid software, editor-librarians for any level user: MIDI any Apple II"s, GS, MAC, C-64, C-128, IBM/Compatibles/Laptops, Atari ST, Amiga. Canadian Orders & School P.O.s welcomed! Complete 1991 MIDI Buying Guide Catalog-
Call or write to
SOUND MANAGEMEMT
Electronic Music Products
P.O.Box 3053
Peabody, Ma 01961
Check, MO, VISA, MC School P.O.
Call 1-800-548-4907 Orders USA
Call 1-531-6192 foreign countries

SOFTWARE

EUROWORKS ADDS FOREIGN LANGUAGES TO APPLEWORKS
Type French, German, Italian, Portuguese, or Spanish quickly, simply with the classic AppleWorks word processor. Then, from inside AppleWorks, EuroWorks prints your foreign text on an ImageWriter or true compatible. Print every keyboard character plus 8 new ones plus 13 French, 7 German, 10 Italian, 13 Portuguese, or 10 Spanish.No conflict with TimeOut. EuroWorks REQUIRES an ImageWriter I, II, or LQ; Apple DMP; MT85/86; or Seikosha SP-1000AP. SPECIFY APPLEWORKS 2.x or 3.0. ORDER FRENCH ($24), SPANISH ($24) or ALL FIVE LANGUAGES ($39). ADD $3 S/H. Check, MO, Net-30 School PO, VISA/MC. Brochure on request.
The S.A. AuTeur Co A66
PO Box 7459
Beaverton, Oregon 97007
(503) 645-2306

ROOTS AND RELATIVES
For the Apple II plus, IIE, IIC, IIGS
Turn record chaos into an orderly system
Record and file each family;
Prepare lists, charts and family index
unlimited capacity
Operator friendly
Two Disk drives required
ProDOS Operating System
Complete System.....$99.50
Large sample kit.....$5.00
Satisfaction guaranteed or complete refund less$10.00 restocking fee.
Send check or money order to

GATEWAY SOFTWARE
639 Consol Avenue
Winnipeg, MB.
R2K 189

ADDRESS MASTER
Tired of that messy address book ? Do you have better things to do than address Christmas cards? Ever forget to send birthday or anniversary cards on time? You need Address Master! Prints pocket size, 1 or 2 sided Address Book.List alphabetically or by dates, mailing lists, ZIP Codes, relationships, and more: on screen, paper, or labels. IIGS & Mac (512K, ImageWriter), and IBM PC (256K, DMP or laser printer).Demo disk $5.00. Can apply to purchase price of $39.95 + $4.00 S&H.CA add tax. 30 day refund guarantee. VISA, MC, COD, check, or MO.
Prelude Software,Inc.
P.O.Box 1317
Costa Mesa, CA92628-1317
714-751-5736 (8-12 Tues-Sat)
800-678-7613(24 Hour order)
714-953-8893(24 Hour Order)

FAMILY ROOTS, LINEAGES, TREE CHARTS
From our collection of software to keep track of your family, choose one to fit your needs and pocketbook! Our software handles gobs of data for each of millions of people. Print pedigree and descendants charts, group sheets, person sheets, indices of names, address labels, more. Do screen tracing and searches. Compatible with your word processor. Call for a FREE catalog. Satisfaction guaranteed! Prices start at $49. All Apples, Macs, PCs, and more. MC/VISA/AMEX
QUINSEPT
PO Box 216
Lexington, MA 02173
617-641-2930 (Mass.)
800-637-7668 (USA & Canada)

PLAN-MAKING SOFTWARE FOR ALL APPLE II AND MACINTOSH PLATFORMS-FEATURING AWARD WINNING HOME DESIGN PROGRAMS FOR THE APPLE II GS

DESIGN YOUR OWN HOME: ARCHITECTURE Draw floor plans and structural details, prints plans to scale. Apple II, $69.95, IIGS: $89.95, MAC:$99.95.
DESIGN YOUR OWN HOME: INTERIORS Draw room plans, arrange furniture and explore color schemes. Great for kitchen and bath design! Apple II, $69.95, IIGS: $89.95, MAC:$99.95.
DESIGN YOUR OWN HOME: LANDSCAPE Create complete landscape plans, age plants to determine correct placement, and prepare shopping list for your trip to the nursery. Apple II, $69.95, IIGS: $89.95, MAC:$99.95.

DESIGN YOUR OWN RAILROAD: Apple II: $49.95. Design precision, to-scale (HO,N,Z,O,S,G) layouts and run realistic railroad simulations.
DESIGN YOUR OWN TRAIN: Apple II: $49.95. The train and transit system construction set.
RUN YOUR OWN TRAIN: Apple II: $34.95. The flight simulator for down to earth people.
.Check/Visa/MC.
ABRACADATA
PO Box 2440 Dept. DD
Eugene, OR 97402
Orders: (800) 451-4871
Information: (503) 342-3030

BOLD IMAGES! LARGE GRAPHICS! UNIQUE BORDERS! SPECIAL MESSAGES!

Art Gallery II* has just what you need to add zip to your next AppleWorks GS desktop-publishing project! Whether it's a club announcement, school report, business flyer, or personal memo...Art Gallery II gets attention with eye-catching graphics!

Designed exclusively for *inCider/A+*, this collection gives you a wide variety of high-quality, crisp, clean images from which to choose. Our first Art Gallery was so popular that we created this second collection with bolder, larger graphics, PLUS, we made it even better by adding exciting, borders and special-occasion messages.
OVER 200 ORIGINAL IMAGES IN ALL!

Only $39.95!

And to complete the package, extensive documentation is included in a 20-page manual with step-by-step instructions and illustrations of every graphic.

STILL AVAILABLE!
Get more of a good thing! A limited supply of **Art Gallery I*** is still in stock. Great clip-art at a great price! **Just $39.95** for over 200 pieces of original artwork PLUS a reference chart with complete instructions and illustrations.

SAVE $10!
Get both volumes for just$69.90!

Canadian orders: add 7% GST. Foreign air mail: add $3.95. Foreign orders must be paid in U.S. funds drawn on a U.S. bank.

* Require AppleWorks GS v. 1.1. AppleWorks is a registered trademark of Apple Computer, Inc. licensed to Claris Corporation.

CALL TOLL-FREE 1-800-343-0728
(In NH: 924-0100)

inCider/A+ Special Products
80 Elm Street
Peterborough, NH 03458

HIA1B

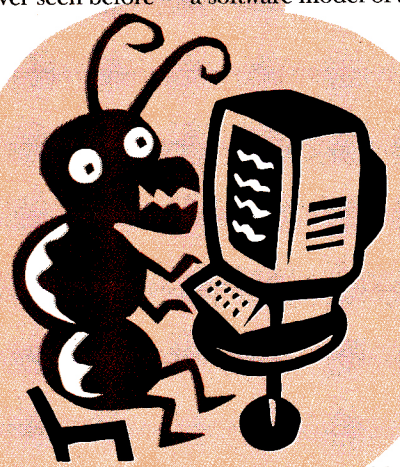
DOWN ON THE FARM

"Go to the ant, thou sluggard; consider her ways, and be wise."

Come to think of it, just about everything you do on your computer is an electronic simulation of something else. Your spreadsheet simulates an accountant's ledger, your database manager a filing cabinet, your word processor a typewriter. So it should come as no surprise that when you decide to kick up your keyboard and have some fun, you turn to a software simulation for that, too. **SimAnt**, an ant farm for your Macintosh, is the latest simulation toy from Maxis Software. It's at least as educational as SimEarth and SimCity, and it's more fun — it's more obviously a game.

Software simulations go back a long way in the history of personal computers. Remember Lemonade Stand on the old Apple IIs? Lots of schools still use that game to teach business. And more flight-simulator software has been sold than any other kind of entertainment program.

But when Maxis released SimCity in 1989, it was a type of game most of us had never seen before — a software model of a community, based on as many variables interacting in as many ways as the computer could handle. If you were a biologist or an engineer, you might have built a computer model of population growth or traffic patterns that resembled SimCity, but for the rest of us, it was the kind of science most of us saw only on *Nova*. Maxis brought it home — in a box in the entertainment section of the software store. Anybody playing with this software toy was playing with the kind of tool real scientists use.

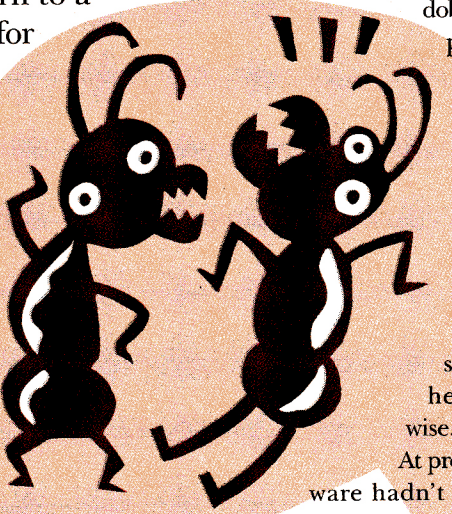


SimEarth is a quite graphic demonstration of the ecological truism that "everything's interrelated." Like SimCity, SimEarth charts progress with graphs and brightly colored maps. It's easy to forget that these games aren't real, because what you see on the computer monitor is just the sort of display a real scientist running a simulation of a real system would see.

SimAnt is different. For one thing, it's a model of a system that's small enough to fit into a breadbox. Another consideration is the question of its originality. Its designers must have known that critics might reduce it to "just a high-tech ant farm," because they made SimAnt more like a game. And SimAnt can be played "competitively": You lead the black ants, the computer's in charge of the reds, and it's a battle royal to kill the queen. (It's not as violent as it sounds.)

You can play this game just for fun, of course — but it's sure not hard to pick up lots of facts about scent trails, homing behavior, and queening among social insects — no more difficult than learning about urban design as you play SimCity or earth science as you play SimEarth.

SimCity was inspired by *The Urban Pattern: City Pattern and Design*, Arthur Gallion and Simon Eisner's 1986 guide to city planning. James Lovelock's controversial 1979 best seller *Gaia: A New Look at Life on Earth* was the prime mover behind SimEarth. We're happy to report that the book that drives SimAnt is E.O. Wilson and Bert Holldobler's 1990 Pulitzer-prize winner, *The Ants*. These games are deep. Don't like the notion that you might have to read a book to play a game? Our advice is proverbial: "Go to the ant, thou sluggard; consider her ways, and be wise." Believe it.



At press time Maxis Software hadn't yet set a price or system requirements for SimAnt. SimCity costs $49.95 for the Mac Plus and later machines with 512K of RAM (random-access memory), or $79.95 for color Macintoshes with 2 megabytes of RAM. SimEarth costs $69.95 for the Mac Plus and later machines with 1 megabyte of RAM.

For more information, contact Maxis Software at 2 Theatre Square, Suite 230, Orinda, CA 94563-3041, (415) 254-9700, or Broderbund Software (distributors), 17 Paul Drive, San Rafael, CA 94903-2101, (415) 492-3200. ❑

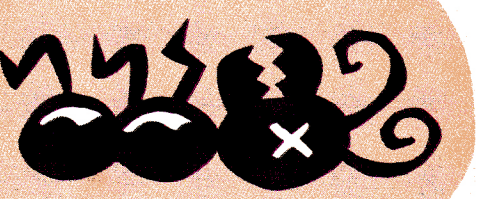


Illustration • Bob Zimmerman

TMS Peripherals

Authorized Quantum Dealer

"Great drive! Thanks for your excellent service!"
—Jim Sulsona

"The sales reps. are knowledgable, the shipment was sent out immediately and the drive is absolutely fantastic. Hats off to the people at TMS Peripherals!"
—Peter Wilding

"...they absolutely excel in having the best technical service that I have ever encountered."
—Webster W. Plourd
Col. USAF (Ret.)

"If you need a hard drive, I highly recommend that you buy it from TMS. I was impressed with TMS' products and service...they truly deserve your business."
—Steven W. Disbrow
Publisher, *GS+* Magazine

WE ARE DEDICATED TO CUSTOMER SERVICE AND SUPPORT.

We're not just about great products at great prices, we're about excellent service too!

- Each *factory fresh* TMS drive is completely tested and verified by our technicians before it is shipped.
- TMS Peripherals' 30 Day Performance Guarantee: *"If you experience a problem with your drive, TMS will ship you a new drive and pick up the suspect drive (at our expense), leaving you with virtually no down time!"*
- TMS Peripherals' Full 2 Year Warranty / Toll-Free Tech Support Line—if your problem persists after thorough troubleshooting by our courteous, expert technical staff—just ship us the suspect drive and we will send you a replacement unit within 48 hours.
- All Apple drives are preformatted and partitioned and come with the latest System Software & 8+ Mb's of shareware. All Macintosh drives are preformatted and come with the latest System Software and 19+ Mb's of BMUG shareware. DISK DOUBLER by Salient Software is bundled with all TMS hard drives.
- Of course, each drive also comes with our enthusiasm for each of our products! For your convenience, we're open 8am-8pm (EST) Monday-Saturday and all products ship Federal Express. C.O.D.'s and P.O.'s welcome.

TMS WILL MATCH ANY NATIONALLY ADVERTISED PRICE. FINAL PRICE MATCH AT TMS' DISCRETION. All prices subject to change.

FREE
FEDERAL EXPRESS SHIPPING
PLEASE CALL FOR DETAILS!

1.800.626.MEGS

1120 Holland Dr., Suite 16
Boca Raton, Florida 33487
Internat'l. 407.998.9928
FAX: 407.998.9983

FEDERAL EXPRESS

VITESSE

"Setting a new standard in utilities for the Apple market." *InCider A+ '91*

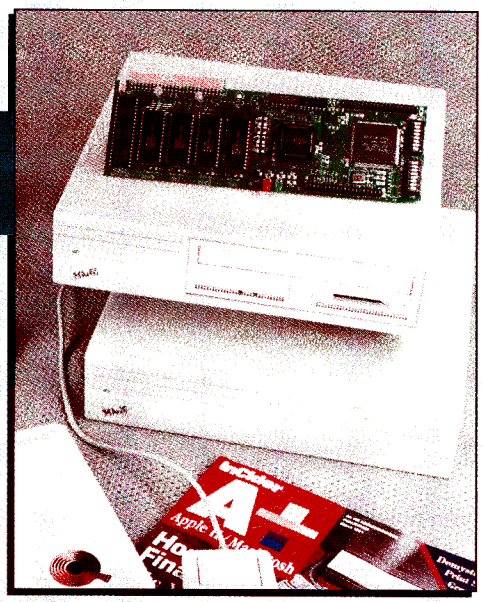
SALVATION SUPREME

ALL 5 Salvation Utilities for the IIgs. Only $89.95

Salvation Utilities

This is the complete utilities series for IIgs users. Includes virus detection & cure, backup utility, hard disk optimizer, manager, and file repair & recovery.

Bakkup, Renaissance or Deliverance	**$28.95**
Exorciser	**$27.95**
Wings	**$45.95**
Quickie Scanner—400dpi Hand Scanner for Apple IIe & IIgs	**$195.95**



QUANTUM STORAGE SUBSYSTEMS

TMS PRO SERIES HARD DRIVES

	Int.	Ext.	
Pro 52 LPS	**$249**	**$349**	11ms
Pro 105 LPS	**429**	**529**	11ms
Pro 120	**659**	**759**	10ms
Pro 170	**729**	**829**	10ms
Pro 210	**799**	**899**	10ms

SYQUEST REMOVABLE HARD DISKS

TMS Pro R45, **$489** • 20ms • extra carts **$67.95**
TMS Pro R88, **$1319** • 20ms • extra carts **$139.95**

TAPE BACKUP SYSTEMS

TMS Pro T60, **$439** • extra tapes **$15.95**
TMS Pro T155, **$499** • extra tapes **$24.95**

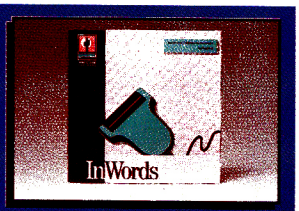
CHINON

TMS CD ROM, 350ms, only **$579**

PRO SERIES STANDARD FEATURES

- International Auto-Switch Power Supply
- Selectable Pushbutton SCSI ID Switch / VCA Mechanism
- 2 SCSI Ports / 2 AC Jacks / Shielded Power Supply
- Thermostatically Controlled "Whisper Quiet" Fan
- Shareware / ALL Hardware & Manuals

INWORDS by WESTCODE



$79.95

Discover the power and ease of InWords™ today—InWords provides a revolutionary new way to enter text into your Apple II. Instead of slow tedious typing, InWords will input information at up to 500 words per minute. By simply passing your hand-held scanner over the page, you can create a word processor, data base, or spreadsheet file without typing a single word. Requires 512K and Quickie or LightningScan.

APPLE SOFTWARE

Apple Works 3.0	**$165.95**
Apple Works GS 1.1	**$195.95**

GLEN BREDON SOFTWARE

ProSel 16	**$66.95**
ProSel 8	**$29.95**
DOS.Master	**$19.95**

C.V. TECHNOLOGIES

RamFAST SCSI v 2.0, **$189.95** or **$179.95 with the purchase of any drive!**

GS-Memory Boards

0 Mb	**$79.95**
1 Mb	**$142.95**
2 Mb	**$194.95**
3 Mb	**$246.95**
4 Mb	**$299.95**

RAM Chips: 256k 100ns (set of 8), **$17.95**
1MB 100ns (set of 8), **$65.95**

ZIP™ TECHNOLOGY

ZIPGSX, 7 MHz/8k Cache memory, DMA Compatible, **$148.95**
ZIPGSX, 8 MHz/16k Cache memory, DMA Compatible, **$198.95**
ZIPGSX, 9 MHz/32k Cache memory, DMA Compatible, **$248.95**

Æ APPLIED ENGINEERING

Æ PC Transporter 768k	**$249.95**
Æ PC Transporter GS Kit	**$36.95**
Æ 3.5" 800k	**$195.95**
Æ 3.5" HD 1.6 Mb	**$235.95**
Æ DataLink 2400 Internal	**$159.95**
Æ DataLink 2400 Express	**$159.95**
Æ DL 2400 Express w/ MNP5	**$189.95**
Æ DL 2400 Express w/ MNP5/FAX	**$215.95**
Æ ReadyLink	**$56.95**
Æ Conserver	**$74.95**
Æ Power Supply IIe	**$74.95**
Æ Power Supply GS	**$84.95**
Æ TransWarp GS 32k	**$299.95**
Æ TransWarp 32k	**$79.95**
Æ RamWorks III 0k	**$119.95**
Æ RamWorks III 256k	**$129.95**
Æ RamWorks III 512k	**$149.95**
Æ RamWorks III 1 Mb	**$179.95**

Circle 56 on Reader Service Card.



IIGS High Density arrives.

AE's new 3.5 High Density Drive™ for the IIGS sets a new standard for Apple IIGS storage. 1.6 MEG capacity means you can stop playing diskette roulette. Simply store your large 2-disk application programs on one, high density disk and forget about fumbling for clumsy "sets" of disks. And storing files just became twice as easy too, because you'll only need half the number of disks.

Compatible with all versions of GS/OS, our design incorporates the same, top-quality SONY mechanism that Apple uses. Aesthetically, the AE Drive is every bit as handsome as the Apple Drive. We designed a thick, high-impact plastic case to stack with and exactly match the footprint of Apple's drive. But AE's drive gives you twice the capacity at a far lower price.

Our exclusive 2-way LED indicator shows green for reading, red for writing. Now you can monitor the drive's progress and know that a disk is actually being copied, instead of being confronted with an ambiguous "on" light.

The 800K version of the AE drive works with the IIe, IIc Plus, IIGS, Macs and our PC Transporter. For IIe owners, we've even designed a low-cost optional controller card that allows the IIe to accept data from the 3.5 format. The AE Drive is also Macintosh compatible as an 800K drive. And owners of AE's 800K drive wanting 1.6 MEG high density capacity for their IIGS can affordably upgrade.

High density is quickly becoming the standard for other personal computer platforms. Now you can bring the power and convenience of high density to your IIGS!

Features

- 800K, upgradeable to 1.6 MEG on IIGS
- 2-way LED indicator, red for read, green for write
- Auto eject
- Daisy chain port - works both ways, connect a drive to it, or connect it to another drive
- 1 year warranty
- Apple compatible, works as 800K drive with IIe, IIc Plus, IIGS, Mac and PC Transporter
- Stack and footprint compatible with Apple Drive
- Conserver compatible

AE 3.5 Drive (800K) **$279**
AE 3.5 IIGS High Density Drive (1.6 MEG-GS only)..... **$339**

Order today! To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 11 pm, 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 7 1/4% sales tax. Shipping not included.

Applied Engineering®
The Apple enhancement experts.
A Division of AE Research Corporation

(214) 241-6060
P. O. Box 5100
Carrollton, TX 75011

Made ★IN THE★ USA

©1990. AE Research, Inc. All rights reserved. Prices subject to change without notice. Brand and product names are registered trademarks of their respective holders