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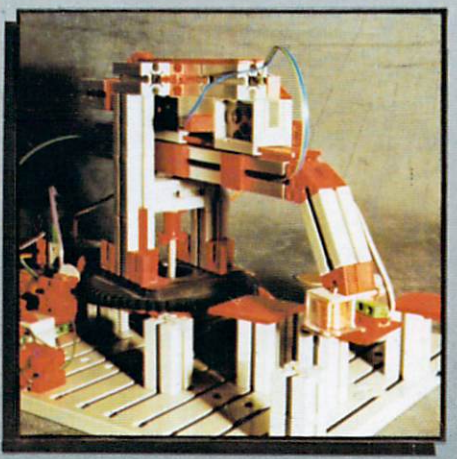

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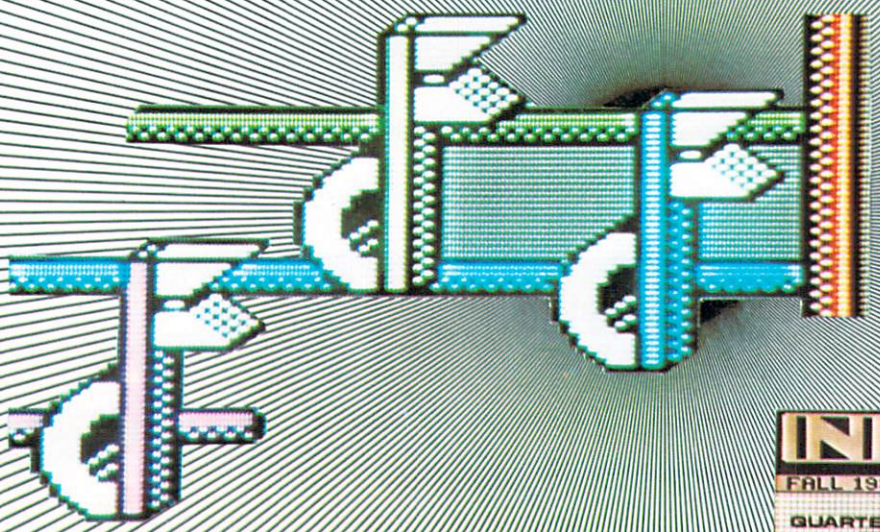

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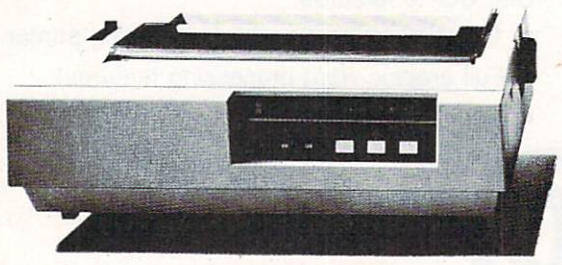

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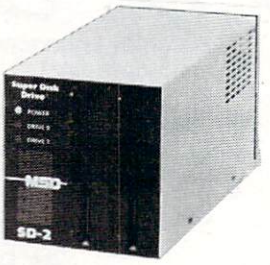

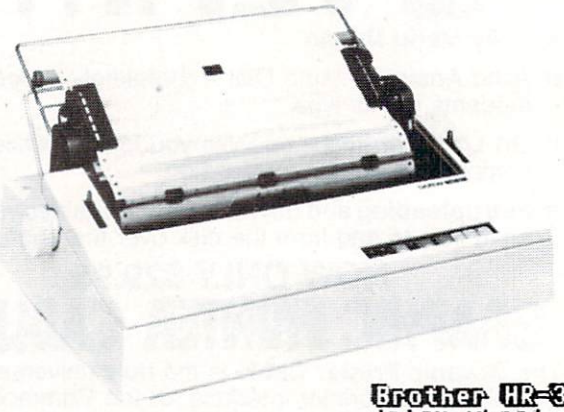

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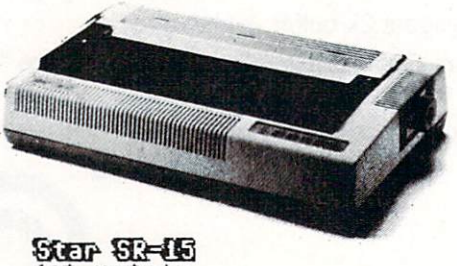

Star SR-15
dot matrix

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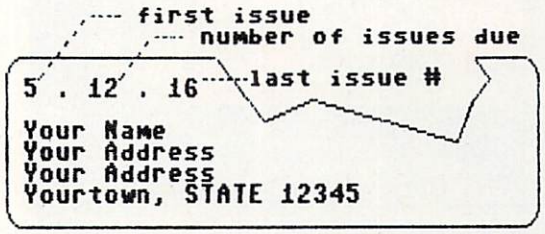

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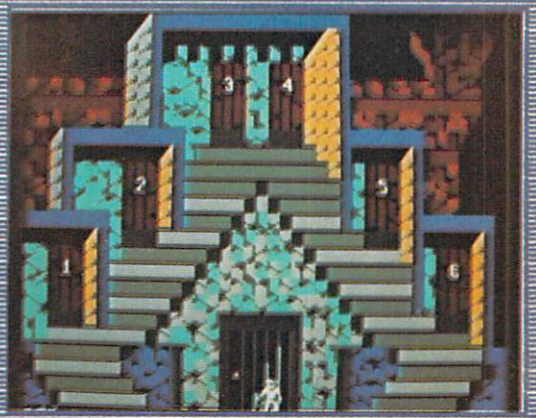

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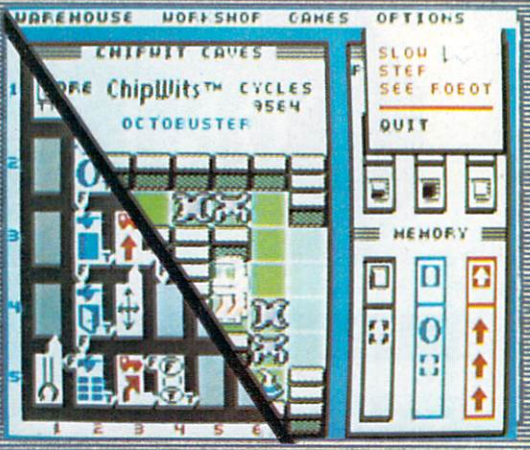

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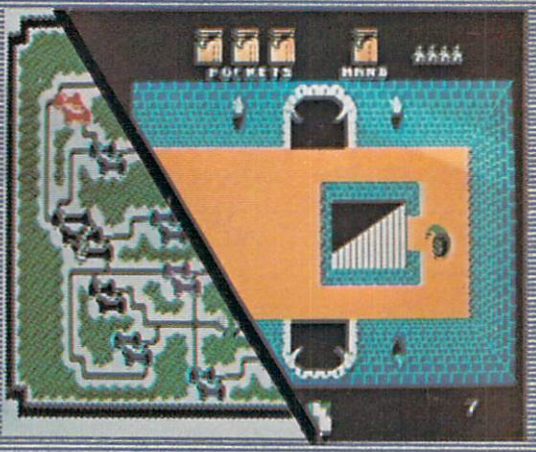
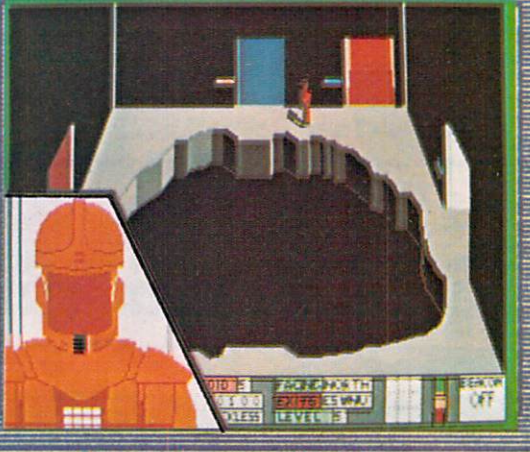


Alcazar: the Forgotten Fortress

Kennedy Approach

The Serpent's Star



Countdown to Shutdown

GALLERY

INDIANA JONES IN THE LOST KINGDOM | ★★★-

MINDSCAPE INC.
3444 DUNDEE RD.
NORTHBROOK, IL 60062

The idea is great: a set of problem-solving games with no instructions (you must use your wits & logic, "like Indy" to survive and complete the six rooms).
Unfortunately, the packaging, marketing, concept, and intended cinematic associations fail to translate into a satisfying product. This game is boring, roughly animated, and sure to disappoint Indiana Jones fans. Better title: "Indiana Jones in the Kingdom of Lost Causes".
-BD

CHIPWITS | ★★★★★

EPYX
1043 KIEL COURT
SUNNYVALE, CA 94089

A fantastic program that is as educational as it is entertaining. Using the increasingly popular pull-down menu scheme, you choose one of 16 CHIPWIT robots and program it to solve one of the 8 varying-difficulty adventures. Programming is done with pictures (see inset) and can be rather elaborate. Hands-on trial and error environment combined with attractive screens and animation create a world where playing and learning become (as they should) one and the same.
-BD

ALCAZAR: THE FORGOTTEN FORTRESS | ★★★★-

ACTIVISION, INC
DRAWER 7286
MOUNTAIN VIEW, CA 94039

Interesting graphic variation of the ubiquitous dungeon adventure. You must collect and properly use the right objects and weapons in order to overcome your various adversaries and complete your quest. You keep three items in your pockets, the one in your hand is active. An on-screen map shows which rooms you have visited in each castle. Large overview map guides you from one castle to the next. Beware of the many bottomless pits.....
-BD

KENNEDY APPROACH | ★★★★

MICROPROSE SOFTWARE INC.
120 LAKEFRONT DR.
HUNT VALLEY, MD 21030

Best air traffic controller simulation to date. This simulation sports several advanced and unique features that help make it work: good quality software speech synthesis adds considerably to the realism (you will actually hear the conversations between the pilots and the tower!) and a clever system for visually indicating the altitude of planes gives you 3-D visual information on a 2-D game grid. If you are not getting enough tension in your life, this should help!
-BD

THE SERPENT'S STAR | ★★★★

BRODERBUND SOFTWARE INC.
17 PAUL DRIVE
SAN RAFAEL, CA 94903

This hybrid adventure game (pictorial screens accompany the interactive text interface) is a noticeable improvement over Broderbund's last adventure, "Mask of the Sun". You will especially like the toggle for fast or slow travel between locations. I found the screens to be colorful, the action smooth, the parser forgiving and intelligent, the storyline interesting, the puzzles just hard enough, the humor refreshing with a nice beat and easy to dance to: I give it a 4. -BD

COUNTDOWN TO SHUTDOWN | ★★★★+

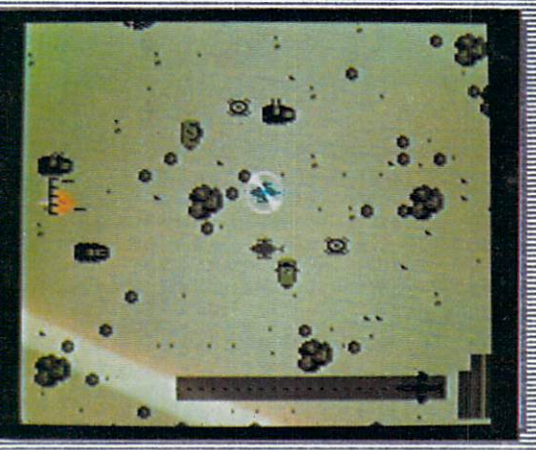
ACTIVISION, INC
DRAWER 7286
MOUNTAIN VIEW, CA 94039

One of the better offerings from Activision since "Ghostbusters". Even before you figure out the object of this game, you will be enjoying the delightful 3-D graphics effects, well-done animation (with shadows), sophisticated sound effects, detailed information displays, and fluid gameplay. I love the way the sliding doors glide open and shut with a convincing pneumatic "hiss"! The object? Your androids JUST have to prevent a nuclear meltdown! Piece of cake.
-BD

GALLERY

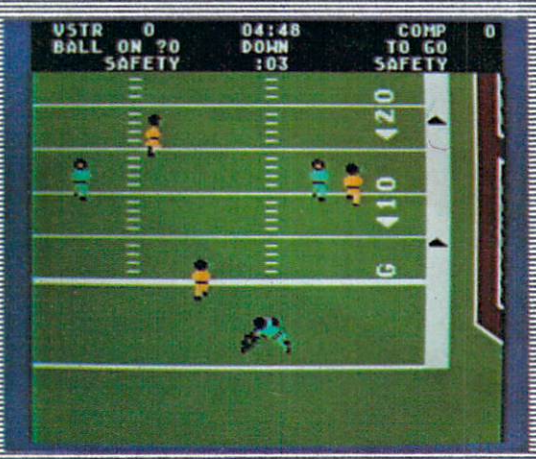
Archon II: Adept

Crusade in Europe



G.I. Joe

Moonsweeper



On-Field Football

Sky Travel

GALLERY

ARCHON II: ADEPT | *****

ELECTRONIC ARTS
2755 CAMPUS DRIVE
SAN MATEO, CA 94403

If you liked Archon I, then you won't be disappointed by "ADEPT" (the sequel). More magic, more spells, more nasty critters. This is a multi-facetted game that plays like chess on the surface, but dives into fast-paced arcade-grade action whenever combat ensues. EA delivers the usual excellent graphics, crisp animation, and sound effects we have come to expect from them, with smooth gameplay via the joystick. I don't know if you can win this game; I get my hiney kicked evey time! -BD

CRUSADE IN EUROPE | ****

MICROPROSE SOFTWARE, INC.
120 LAKEFRONT DR.
HUNT VALLEY, MD 21030

From D-Day to the Battle of the Bulge, you will have the chance to replay the hands dealt by history in this real-time strategic war-game simulation. A large scrolling map shows terrain and troops with your choice of symbolic or pictorial game pieces. Commands and various status updates are transmitted in the text area at the top of the screen. Very easy to start playing, but amply complex for crustier war-gamers. Sound effects and graphics are just right. -BD

G.I. JOE | ****

EPYX
1043 KIEL COURT
SUNNYVALE, CA 94089

This game surprised me. From the few excerpts I'd seen, along with the mentality usually attendant with such toy-fad fare, my thumbs were already twitching toward the ground when I got around to testing this title. Actually, the game is quite decent with several phases including hero/opponent choices, mission selection, and combat. While the hand-to-hand sequences are a bit goofy, the equipment combat is better than either BLUE MAX or BUNGELING BAY.

-BD

MOONSWEEPER | ***

IMAGIC
981 UNIVERSITY AVE.
LOS GATOS, CA 95030

MOONSWEEPER has some interesting effects, but suffers from repetition. The foreshortened scrolling background is perhaps the game's strongest feature.

Basically you shoot the creeps, rescue the good folk, and get the heck out. Then you do it all over and over again with increasing levels of both difficulty and tedium.

-BD

ON-FIELD FOOTBALL | ****

GAMESTAR
1302 STATE STREET
SANTA BARBARA CA 93101

ON-FIELD FOOTBALL rounds out the Gamestar series of animated action sports titles. While this version of the Great Sunday Obsession sends only 6 warriors per team into the skirmish, the action is well-done, with Gamestar's usual attention to providing an elaborate range of joystick control over game options and player actions. This can take some getting used to, especially in FOOTBALL. Scrolling screen allows full-field play. One or two players.

-BD

SKY TRAVEL | *****

COMMODORE BUSINESS MACHINES
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Well, Commodore has done it again! An educational AND fun masterpiece! This electronic planetarium displays more than 1200 stars and 88 constellations in their proper positions over a 10,000 year period. Clock drive tracks heavens at up to 32X normal speed. Celestial and world maps may be displayed. Screens can be dumped to printer. Data line displays identities of all visible objects. As if this were not enough, SKY TRAVEL is salted with visual jokes (look down and see your shoes!) A must buy! -BD

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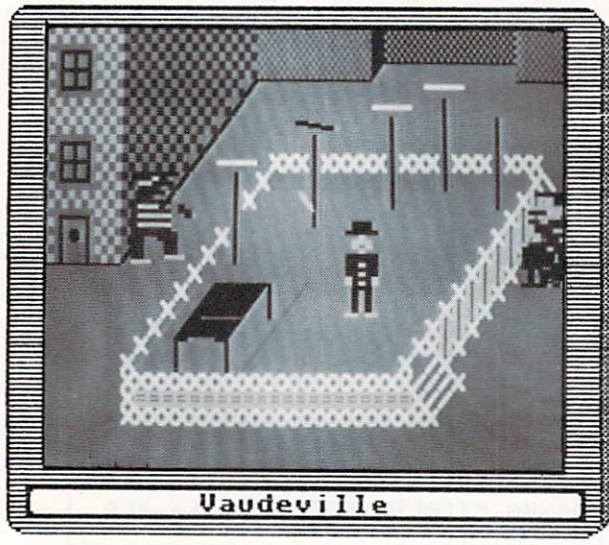

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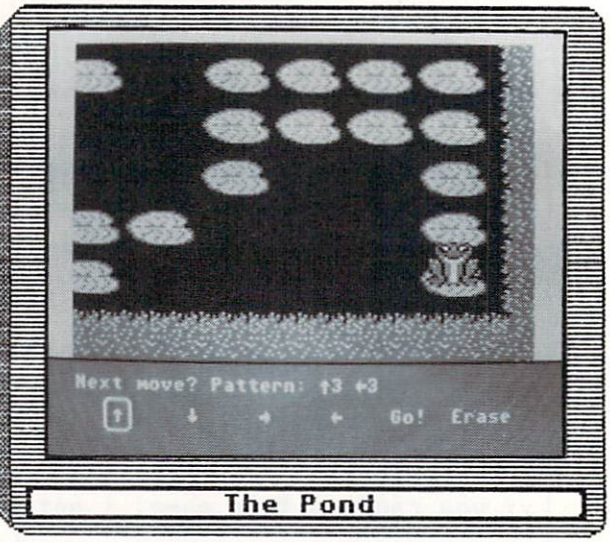

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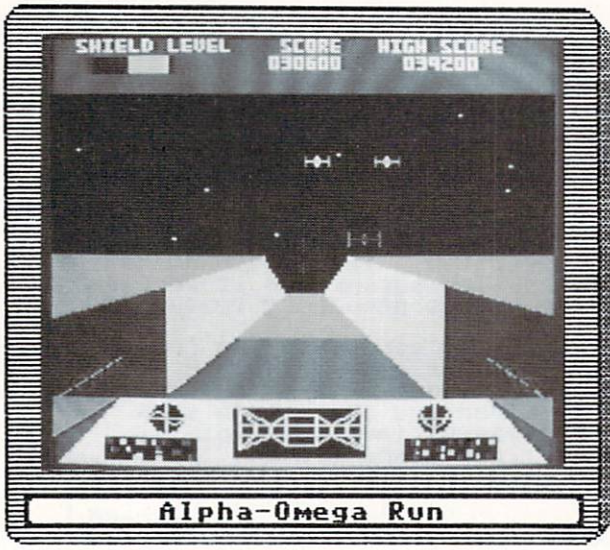
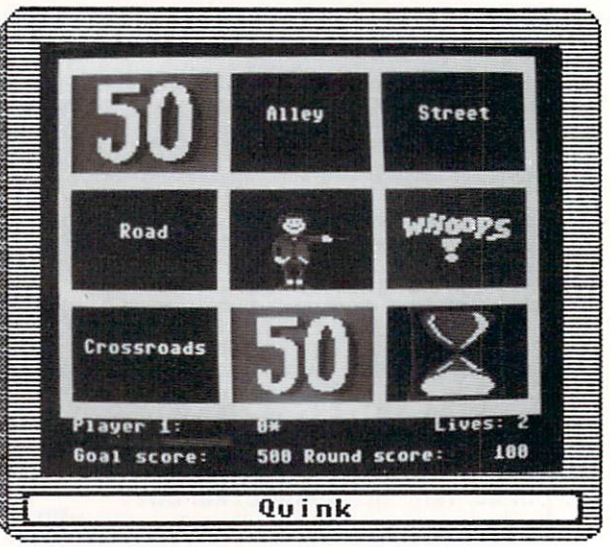
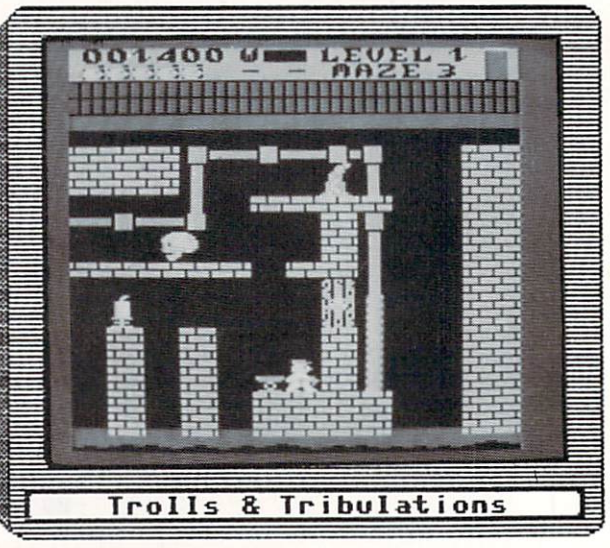


Alpha-Omega Run



Quink

Warp!



Trolls & Tribulations

GALLERY

VAUDEVILLE |***

SHOWBIZ, INC.
3012 CENTRAL SE
ALBUQUERQUE, NM 87106

Maybe I'm getting jaded in my old age (I'm sure I'm not making points with this new advertiser) but I can't think of a single person whose attention would be held by VAUDEVILLE for more than 2 minutes. The premise itself is pretty dry: pick up plates, spin them on sticks, keep them spinning, duck flying objects. What really drags this game down tho, is the execution: blocky sprites, CHARACTER GRAPHICS (in a commercial game??), & crude animation. (May be of interest to insomniacs.) -BD

THE POND |***-

SUNBURST COMMUNICATIONS, INC.
39 WASHINGTON AVE.
PLEASANTVILLE, NY 10570

After titles like THE FACTORY, and MISSING LINKS, this edu-game is a real disappointment.
THE POND is a tedius problem-solving exercise wherein the player must find a pattern that will enable a frog to cross a pond on a pathway of lilly-pads. Using the awkward menus turns out to be the true challenge for a youngster's wits and patience. The game is too dull for normal healthy children, and pales next to efforts like "CHIPWITS". The fact that it won some awards won't impress your child. -BD

ALPHA-OMEGA RUN |***

NANOSEC CORP.
3544 LINCOLN AVE.
OGDEN, UT 84401

Routine space-opera number lacks anything special to recommend it over scores of predecessors. Line 'em up, shoot 'em down. Save the world. You'd think that programmers would get tired of grinding out these endless shoot-em-up clones (I know that consumers are getting tired of buying them.)

-BD

QUINK |****

CBS SOFTWARE
ONE FAWCETT PLACE
GREENWICH CT, 06836

Each screen presents the player with 8 random places, names, or things: some items will belong together by some associating element, while the rest will be totaly unrelated. Sort it out as fast as you can for maximum points. 4500 items from 150 subject areas (like "Birds that Can't Fly", "Tools on a Swiss Army Knife", and "Two-Word Rock Groups"). Nice visual and sound effects. One or two players. One of the most enjoyable word games I've seen on a computer.
-BD

WARP! |***

CREATIVE SOFTWARE
P.O. BOX 61688
SUNNYVALE, CA 94086

The Warpzoids must be stopped! That's the mission in this futuristic highway-hugger from Creative Software.
After games like PitStop II, the animation seems pretty unsophisticated.
An obvious attempt at variety & originality in the game elements keeps WARP! outside the kennel, but not by much. If you want to add a Creative title to your collection, I'd recommend TROLLS (see right) over WARP!

-BD

TROLLS & TRIBULATIONS |****-

CREATIVE SOFTWARE
P.O. BOX 61688
SUNNYVALE, CA 94086

Watch your step as you skulk arround in what appears to be the sewer system of some ancient city: your troll must dodge the under-city denizens who patrol this hazardous but treasure-littered maze.

A familiar game for sure, but somehow more playable than the photos would suggest.
7 levels, 200 chambers, for one player.

-BD

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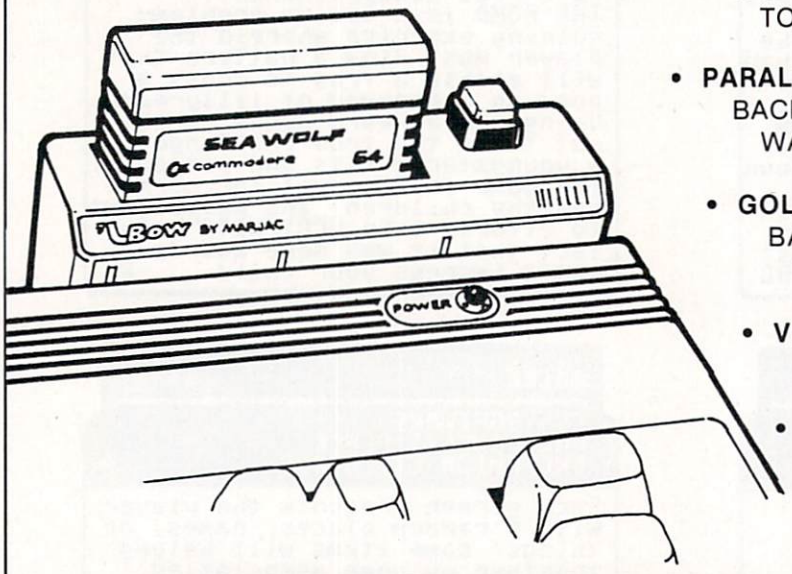

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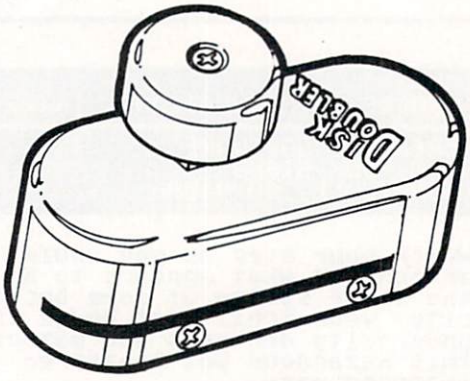

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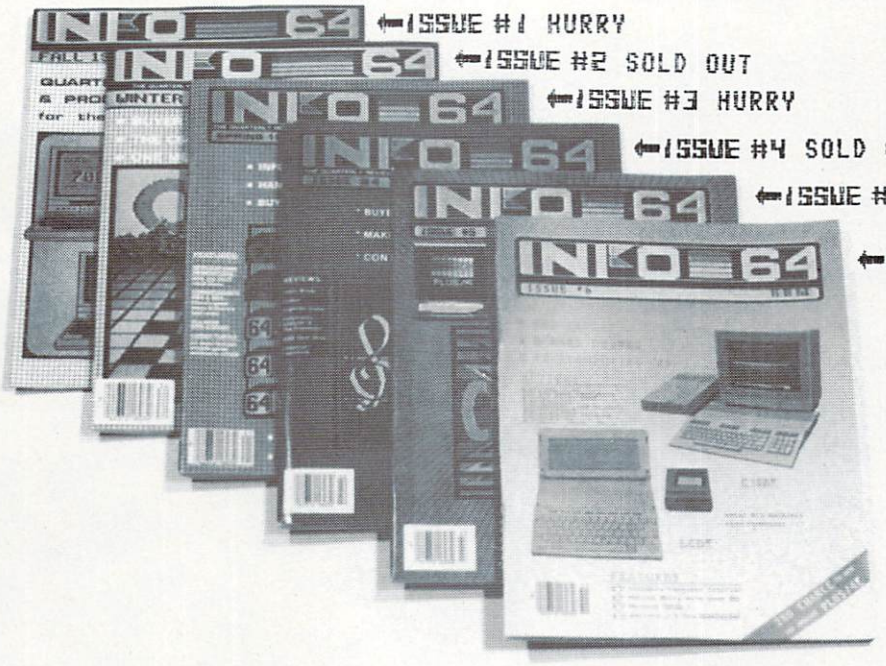

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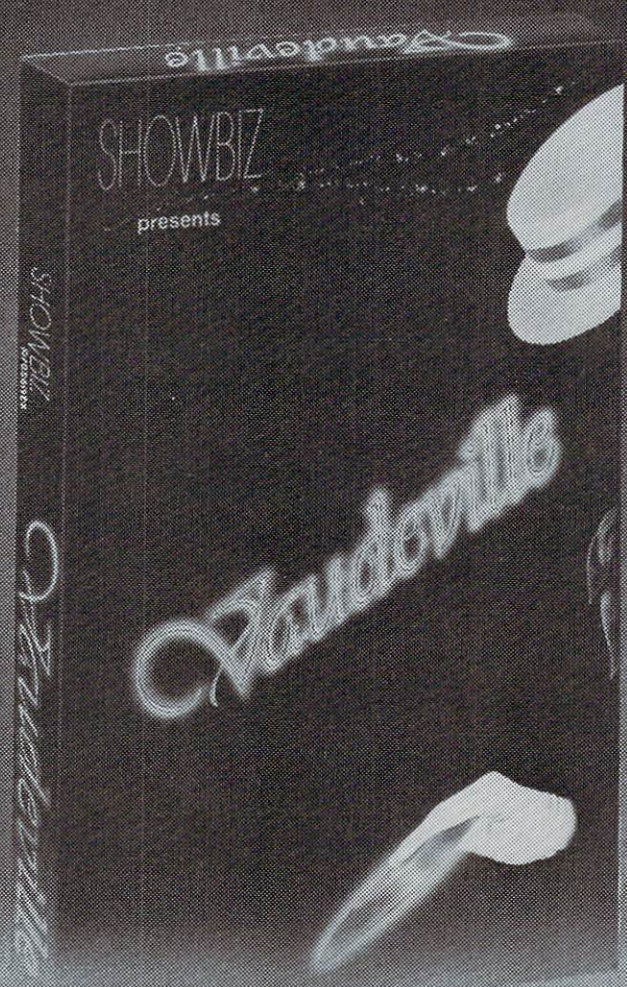

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VALUE

WHAT IS VALUE

val-lue (val yoo) that quality of a thing which makes it more or less desirable, useful, etc.

Value is something we constantly strive for in our role as consumers. But what is it really? Is it **price?** Sure, price is part of it. What about **quality?** Quality definitely plays an important part. Maybe, **good quality at a good price?** This is a step closer, but still not quite all. **Useful?** Of course. What good is quality, even at a good price, if you don't have a use for? So then let's say, **"Value is: A useful, quality product at a good price."**

THE GOAL

Software Value: Useful, quality software at a fair price.

THE PROBLEM

Every computer owner that progresses beyond the early stages, soon begins to add to his collection of programs. As soon as a disk drive is added, this collection literally explodes. Disks are like rabbits; start with a couple and soon they're everywhere! Since a disk can hold a bunch of programs, 10 or 20 disks can mean several hundred programs.

HELP!! To keep all those programs in order you need help. Programs to help you manage your program collection are called utilities.

A utility is a program that fills a specific need. Utilities usually concentrate more on geting a job done well than on being flashy. A collection of utilities is usually one of the first things almost every computer owner starts.

No matter what the main interest is (music, graphics, games, writing programs, etc.) all owners have the same basic needs (move files, copy programs, backup disks, etc.) to maintain their program library.

THE PLAN

We wanted to assemble a collection of really good programs that would simplify maintaining your program library. Programs to cover every phase of this job. A collection that would serve as a solid foundation for anyone just starting their utilities collection, but also allow many people to improve the quality of the programs currently used for these jobs.

We also wanted to price the collection so that even if you only used 1 or 2 of the programs, you would still get your money's worth.

THE PROGRAMS

FAST FINDER: A fast efficient way to maintain a current listing of all your programs.

- Alphabetical listing of all programs in your program library.
- Automatically adds the programs you choose from a disk. No manual entry of programs required.
- Assign your own 3 digit ID number, or use the disk's own ID.
- Find a program FAST. The first 2 or 3 letters of a name gets you a list of programs that match those letters., Your programs will be included. Average time - 1 second.
- List all programs with the same disk ID.
- List all programs to either screen or printer.
- Printed list is 3 columns wide. A few pages for a lot of programs.
- Add names from disk or from keyboard. Keyboard entry allows for adding Commercial disks that have altered directories that can't be listed. Also handy when you add 1 or 2 names to an already cataloged disk.
- Delete single programs, or all programs with a certain ID.
- Each list holds 1000 entries. Up to 5 lists available on 1 disk.

A program that will be of real use for anyone who uses a disk drive and owns more than a few disks.

BULLET COPY: A 4 minute disk copier that copies the whole disk in only 3 passes, using only 1 1541 disk drive, initializes as it copies. This program will save you a LOT of time making backup copies.

HAPPY HOUSEKEEPER: Makes moving programs and files from place to place a real snap. Move 1 program or a bunch. Large buffer. Make multiple copies without having to read source disk each time. Takes the drudgery out of disk library maintenance.

ENVELOPE DIRECTORY: Prints the directory inside a pattern that fits in the disk jacket. Makes it easy to keep the directory for each disk where it belongs, with the disk.

DISK MAP: Prints the directory giving Program name, size, load address, ending address and Track and Sector where program starts. Output to either printer or screen.

DIRECTORY DOCTOR: Loads a directory from a disk, re-arranges the order of the programs, then writes the directory back to the disk in this new order.

All these, plus several other programs will make this a disk you will reach for often. It will save you many hours to use for more important things.

THE NAME

The collection: C-64 UTILITY CITY

THE PRICE

Less than the price of a single program! We think software prices are too high. Hardware prices have fallen sharply in the last 2 years; software prices need to do the same. We have eliminated all the middlemen. By buying direct from us, we can increase the value even more. We even pay the postage.!

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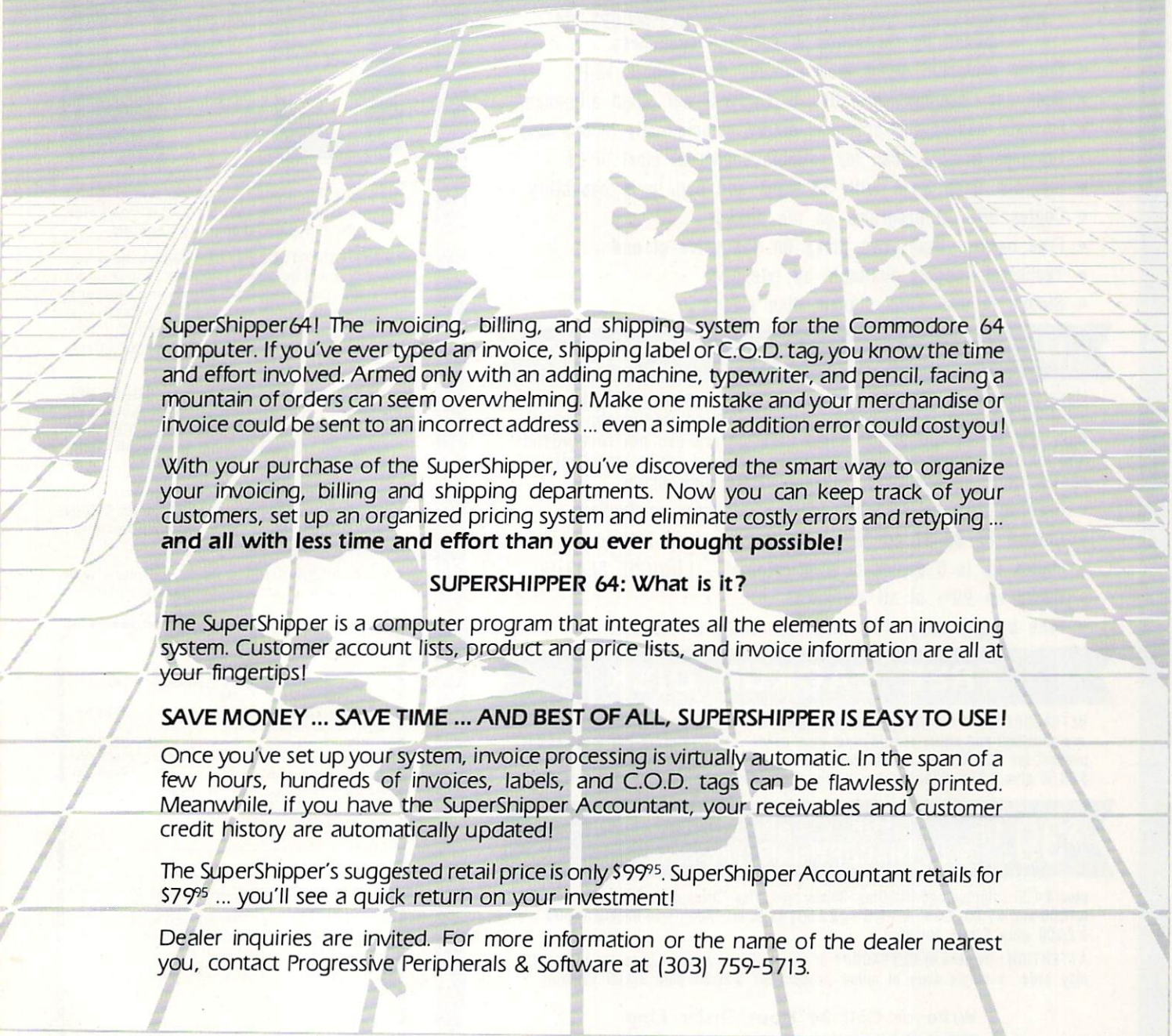
SUPERSHIPPER 64



SuperShipper64! The invoicing, billing, and shipping system for the Commodore 64 computer. If you've ever typed an invoice, shipping label or C.O.D. tag, you know the time and effort involved. Armed only with an adding machine, typewriter, and pencil, facing a mountain of orders can seem overwhelming. Make one mistake and your merchandise or invoice could be sent to an incorrect address ... even a simple addition error could cost you!

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SUPERSHIPPER 64: What is it?

The SuperShipper is a computer program that integrates all the elements of an invoicing system. Customer account lists, product and price lists, and invoice information are all at your fingertips!

SAVE MONEY ... SAVE TIME ... AND BEST OF ALL, SUPERSHIPPER IS EASY TO USE!

Once you've set up your system, invoice processing is virtually automatic. In the span of a few hours, hundreds of invoices, labels, and C.O.D. tags can be flawlessly printed. Meanwhile, if you have the SuperShipper Accountant, your receivables and customer credit history are automatically updated!

The SuperShipper's suggested retail price is only $99.95. SuperShipper Accountant retails for $79.95 ... you'll see a quick return on your investment!

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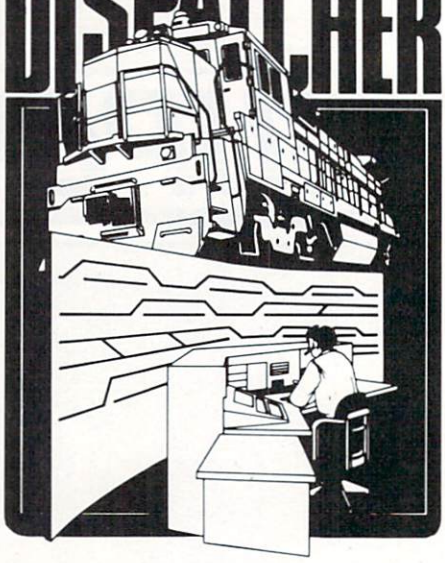

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TRAIN DISPATCHER comes complete with Instruction Manual and keyboard template.

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14 A

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EDITOR'S PAGE
—Benn Dunnington

Corrections

First of all, we blew it on THE PRINT SHOP review. Contrary to Ted's otherwise excellent report, the PRINT SHOP is compatible with several other graphics packages (Flexidraw & Doodle for starters), and is not compatible with the **Commodore** 802 printer or the old Star 10 printer (10X and newer are fine).

Bad ads: WARNING

We are sad, embarrassed, and angry to learn from recent mail and phone calls that two of our previous advertisers, **PHOENIX RED** & **DYNAMIC ELECTRONICS INC.** are apparently accepting and cashing readers' checks for products advertised, and either sending no product, or defective product in return. Neither party will return our calls or letters, and both have had their business numbers disconnected. Please let **INFO** know immediately if you have any trouble with any advertiser in our publication so we can warn others as soon as possible.

WILL THE 128 FLY?

There is no doubt that the **C-128** is an excellent computer and a dynamite value. No one has ever offered so much machine for the dollar. Will it be a big success like the **C-64**? That's a hard one to call. There are so many unpredictable factors involved: Will the production units on the shelves be completely debugged and unproblematic, will consumer desire for the D version undermine the chain store sales, will the **AMIGA** overshadow the whole parade, will the CP/M vendors respond appropriately with re-issued popular titles at realistic prices, will third party vendors respond quickly with software that takes advantage of the 128 mode, and last but not least, will ATARI make good on their ST promise, and be able to pull sales away with **their** new machine. Hang on to your seats- it should be quite a ride!

One Megabyte-$199

The original announcement by Progressive Peripherals of the **Commodore SFD-1001** (SFD for Super Fast Drive) at $399 caused quite a stire a couple of months ago. Now, after some wheeling & dealing by both Progressive Peripherals and Protecto Enterprises, this impressive IEEE dual-sided drive is available (from either) at an incredible **$199!** Highly recommended if you need fast, cheap, extensive data storage. Not compatible with commercial **C-64** software. Requires IEEE interface (not included).

Progressive Peripherals: (303) 759-5713

Protecto Enterprises: (312) 382-5244

Subscriber note:

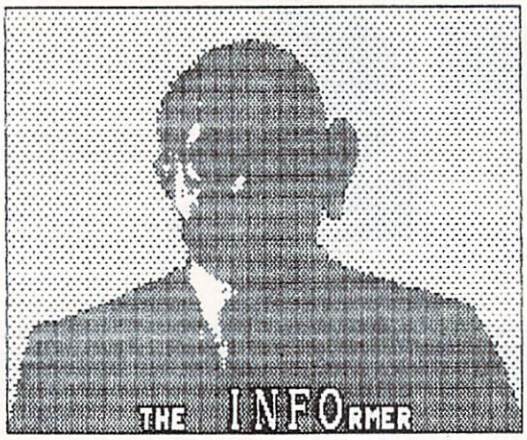
As some of you know, we have only recently offered subscriptions to **INFO.** Prior to iss. #5, you had to pick up your copy at a local dealer or newsstand. This was our attempt to support the dealers (who helped us get started). We finally offered subscriptions for two reasons: 1) many readers weren't able to obtain **INFO** locally (and were sometimes driving 150 miles or more to check on the latest issue!) 2) subscription revenue helps us remain financially resistant to the ever-present pressures of advertisers. The subscription rate structure we have set up is based on 3rd class mailing rates, which allow the price to be the lowest, but which sometimes causes considerable delay in delivery. In the future we will offer a dual-rate subscription with a first-class option for those who want immediate gratification at a premium price, and the third class option for the patient and economy-minded reader. For now, if you want your subscription supercharged, look at your label and send $1.50 (that's what it costs!) for each issue left on your subscription.

New name & look

Well, it had to happen eventually: we have expanded our coverage so much since the introduction of the **C-64**, that **INFO=64** just doesn't fit any more. Starting with issue #8 (July), we will be changing our name to **INFO**, "the useful guide to Commodore computing". We will keep you up on not only the world of the C-64, but also the **C-128, AMIGA, LCD, C-900,** and anything else of interest to the **Commodore** computing community. Only the name & logo will change, the quality, honesty, and excitement that has always gone into every issue will remain.

INFO for the: C=64 C=128 AMIGA LCD C=900

The useful guide to Commodore computing



by: *Buddy Hacker*

Hello out there to all you **Info-64** readers and welcome to **The INFOrmer.** Here in this column I'll present all those juicy "tidbits" of information (including gossip and "hot" rumors) regarding **Commodore** computers and the people who use them; you know -- the "off-beat" news items that usually don't get any attention. I'll keep my "ear to the ground" to bring you all the news and latest "scoops" throughout **Commodore**land! But I'll be depending on **you** to help me out -- after all, I'm only one person and I **can't** be in more than one place at a time, so here's your chance to become a **field correspondent** for **The INFOrmer.**

If you hear of **anything** unusual regarding **Commodore** computers or people using **Commodores**, let's hear about it. The main criteria for inclusion in this column is that the information be **interesting,** and that it can be checked out for validity. If your scoop is interesting, legitimate and I **use** it in this column, you'll be handsomely rewarded for your newshunting with an **Erg=board.** Of course, be sure to include your name, address and phone number with your submissions for **The INFOrmer.** Send them to:

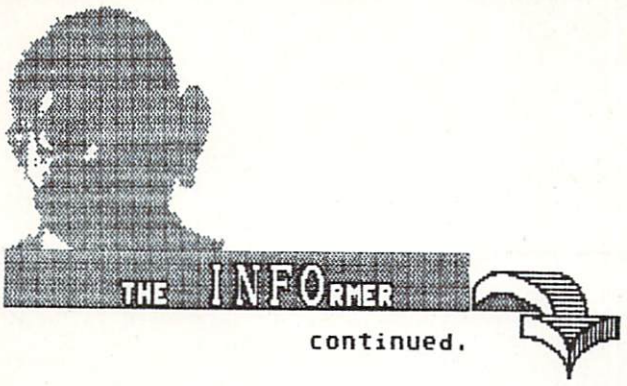
The INFOrmer
Box 4125
Brick, New Jersey 08723
Attn.: Buddy Hacker

From time to time I'll also run some contests, and winners will be awarded prizes. Here's an unusual contest to start you off with this column:
ODDBALL Commodore CONTEST -- This contest will spotlight those curious "mutant" **Commodore**'s that somehow manage to get past the quality control checkers on the assembly lines. For example, I've heard of one user who purchased a 64 and, upon unpacking it, found that **all four** of the function keys had "F1" keytops on them! I've also heard stories of C-64's and VICs that didn't have serial port sockets -- the holes were there, but nothing to plug-in to! I myself have a Plus/4 that has an identifying logo on it calling it a **Commodore** 264, a name it bore early-on during its development. If you've had such an experience, please let me know about it and supply a photograph if possible. The only restrictions are that the submissions must be about **Commodore** equipment, and it **must** have been shipped from the factory in that particular condition -- no "homebrew" modifications, if you please!

MOST UNUSUAL APPLICATIONS -- Know of anyone who's using a **Commodore** for a really **different** purpose? Let's hear about it. For example, **Walter Lee,** the chief of engineering for a video card-game manufacturer, uses his C-64 to control the overhead shades of his outdoor greenhouse! Through a series of sensors and interfaces, the 64 takes readings of the luminosity level of the sunlight, outside temperature, inside temperature and other pertinent data and either keeps the shades open or closes them to regulate the temperature inside the structure. He claims his plants love it, and they're all thriving. While this story illustrates an uncommon application for a computer, I'm sure you readers must know of some **really strange** applications, so let's hear about them!

rumor has it dept.

I had heard that the **Miami Police Department** was installing **Plus/4** computers in its patrol cars to do "instant" checks on traffic violators and crime suspects. I checked it out with the public information office of the **Miami Police,** and uncovered these interesting facts: It turns out that it is **another** future-minded **Florida** police department that is getting serious about **Commodore:** the officers of the **Lakeland P.D.** are working with **Commodore** to install either **PLUS/4**'s or **C16**'s in squad cars which will communicate with the station-house mainframe via radio link. The idea is to allow officers to directly access the main-frame without having to swamp the dispatcher with the overwhelming and endless requests for record checks, daily bulletins, descriptions, etc. **Commodore** is apparently supplying the hardware and consulting time "gratis" in the hopes of setting an example for other police and community agencies to follow. (We'll keep you posted as this project progresses.) And what about **Miami???** It seems that they are indeed using computers in their patrol cars, but they are all part of a **Burroughs** system (!). You might say their taste for such expensive hardware is sort of **'Miami's vice'!** (ouch)



continued.

A little bird based in San Francisco whispered in my ear that OmniWriter/OmniSpell is going to be distributed by **Solid State Software.** This powerful word-processor by **Kelvin Lacy** (who also created VizaStar) was formerly distributed by **HESware. Solid State** may decide to market OmniWriter under the name of VizaWriter, which is the monicker it carries in the European market. My source tells me that an enhancement package allowing automatic pagination is also available for OmniWriter, which will make many users ecstatic. Watch this column for new developments on this topic.

Another West Coast source tells me that **HESware** is alive and well -- doing better every day, as a matter of fact. Apparently the company has been able to survive the bad times it encountered, trim the fat and now they're making a go of it once again.

Remember that great "trade in your old computer and we'll give you $100 toward a C-64" promotion that **Commodore** ran a while back? Needless to say, it was a huge success for the company, but it did give rise to some problems, most notably, what to do with all of the brand-x computers received in trade. A number of enterprising **Commodore** employees found that **Timex-Sinclair** computers sent in on trade made excellent **doorstops.** I know for a fact that this is true -- I **saw it** with my own eyes while visiting **West Chester!**

Also on a recent visit to **Commodore** I noticed certain individuals who shall remain nameless (by their own request) modelling the latest in **West Chester** fashions -- **Jackbuster** T-shirts!. These shirts, stylishly fashioned in a white and red polyester/cotton fabric, sport a picture of ex-head honcho **Jack Tramiel** with a red circle around it and a bar going through it **ala Ghostbusters** logo. I'm presently trying to get my hands on one -- if I can, we'll run a picture of it in a later column, and perhaps even offer it as a prize in one of these contests.

While we're on the subject of **Jack Tramiel,** I should mention that **Commodore**'s **Jack Attack** game was named after him and his infamous verbal "attacks" on employees who did not please him. My inside sources at **Commodore** swear this is the truth.

Synapse Software has been taken over by **Broderbund.** Details of the takeover weren't available at presstime, but preliminary reports indicate that **Broderbund** will continue to market the **Synapse** products under their own banner.

Diane LeBold, Benn Dunnington, Tom Benford and some other prominent "crazy" **Commodore** writers have a date to go **flying** at the **1986 Winter Consumer Electronics Show** in **Las Vegas.** Not with a plane, mind you -- that would be too easy for these folk. It seems that Benn knows of a place in Las Vegas that uses an airplane engine to create a powerful updraft, and you just step off a platform into the draft; the resultant air pressure keeps you afloat!

This "date" was made at the **Infocom** "Murder To Go" press reception at the '85 Winter CES. Well, different strokes for different folks, and all that!

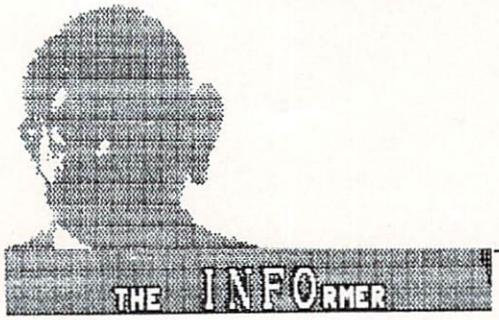
did you know dept.

Commodore is actively courting and supporting third-party software developers for the C-128 and LCD computers. This is a welcome change of attitude on **Commodore**'s part, since the third-party folks are the best sources for new and better software products. Under **Sig Hartmann**'s rule, **Commodore** was in the "software business" and third-party developers were left out in the cold. The new regime at **West Chester,** however, has decided that the best way to go is to concentrate their efforts on making superior hardware and leaving the software development to the experts in that field. This is good news for all of us, and this new attitude is sure to attract lots of talented programmers. Interested third-party developers should contact **John Campbell** at **Commodore,** (215) 431-9180.

Commodore now has a toll-free customer support hot line? The number is 1-800-247-9000, and the folks who man this number will be happy to help you out with questions on products, where to get service, dealers in your area, etc. Don't forget -- it's a toll-free call.

You can select any of the 64 levels of **Jack Attack** by **simultaneously** holding down the shift, ctrl and **Commodore** keys while pressing return. Try it -- it works!

Most **Commodore** cartridge-based games have a hidden "title" page. By experimenting with various key combinations (try the **Commodore** key, shift, ctrl and return at the same time) you can view this hidden page. It usually tells who did what in developing the game, and sometimes, there's even a hidden message! The key combinations aren't always the same, but usually a little experimenting will yield the desired results. The keystrokes I've just described work with the **Lazarian** cartridge, for sure.



continued...

Info Designs at one time tried to thwart the piracy problem by putting holes in certain areas of the disk; by trying to copy the illegal (protected) tracks and sectors, the drive read/write head would get stuck in one of these holes and ruin the mechanism. Fortunately, this form of copyguarding was deemed to be **too** extreme, and they shelved the idea (any company using these **brutal** methods should be severely chastized and given a wide berth! beware: vintage copies of Info Designs' software are still kicking around - **trying to copy these disks will destroy your drive!!**)

EasyScript users can enjoy some music while doing their word processing! By pressing the "F1" key, holding down the "ctrl" key and pressing either the number 3 key or the "pound" sign, you'll hear a lovely rendition of **Pomp and Circumstance.** A **Commodore** source tells me that **EasyScript** only uses about 8K of memory, so they threw in the tune to fill out the remainder of the program control area in memory; pretty slick, huh?

empty rom dept.

I recently received a "freebee" promotional item in the mail from **Handic Software.** It's a reset switch that plugs into the **Commodore**'s serial port permitting you to reset the internal registers without turning the computer off and on again. The only problem is that **my** serial port usually has a disk-drive cable plugged into it. What to do here? Plug it into the extra socket on the disk drive? I tried it that way, but that's no good either; it resets the drive then instead of the computer! I'm retiring it to the **archive of useless equipment,** along with my other "trophies". Nice thought though, **Handic,** and congratulations on winning this month's **"Dubious Achievement Award"!** (the geniuses behind this product must also be responsible for the company's reported recent decision to suspend further work on **Commodore** products and instead enter the **IBM PC** software ring! **Good Luck!** This makes as much sense as **Rodney Dangerfield** giving up on stand-up comedy to pursue a boxing career!)

they'll never take me alive dept.

Since I do my writing from an office in my home, I'm known as an **"electronic cottager".** I feel it is **my right as an American citizen** to make my living this way, if I so desire, and I do. The **AFL-CIO,** however, disagrees with me and other **"cottagers"** on this point and they have issued a **blanket condemnation** of computer work at home! This national labor organization claims that computer work at home provides the opportunity for labor abuse and they are lobbying for a **ban of all cottage industry work.** Needless to say, this subject stirs a bit of emotion in me every time I think about it. My feelings about this ban, and the **AFL-CIO** too, for that matter, are:

1) Why don't they mind their own **$%&!#!** business -- and --

2) They'll only stop me from writing at home **when they pry my cold, lifeless fingers off the keys of my C-64.** But to do that, they'll have to get past one **very mean German Shepherd** and stop a few steel-tipped hunting arrows.

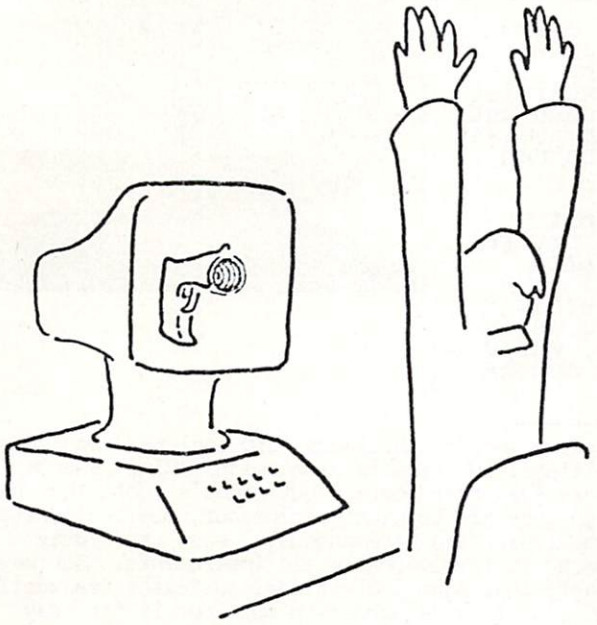
I'll keep you updated on the "Cottagers Conflict" as the story unfolds, and I'd like to hear from **anyone** who has something to contribute on this subject. I honestly believe that this **AFL-CIO** blanket condemnation could only be the **tip** of an iceberg and if these extremists have their way it could well affect **all of us,** not just writers! What an absolute **outrage!** Why don't they dedicate their efforts to trying to find **Jimmy Hoffa** and leave us computer-folk alone? **Buzz-off, AFL-CIO!**
THE-REM-STATEMENT...

Well, that pretty well wraps it up for this issue. Don't forget to contribute your facts, anecdotes, rumors, gossip and "curio" news items -- I'm depending on your input to make **The INFOrmer** a successful column! 'Til next issue...

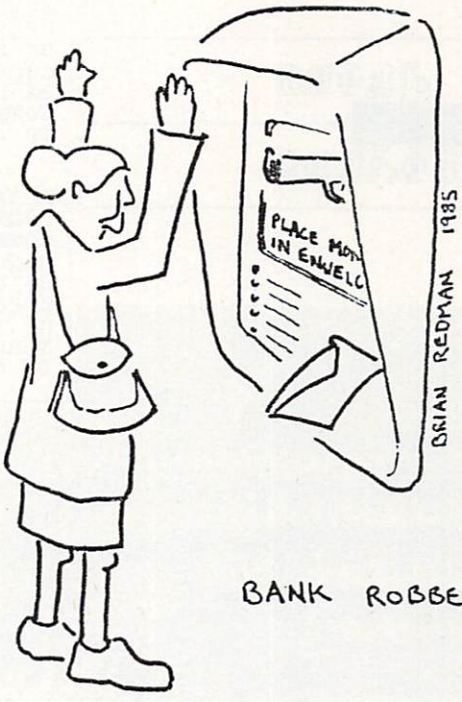
— *Buddy Hacker*

COMPUTER CRIME

Brian Redman

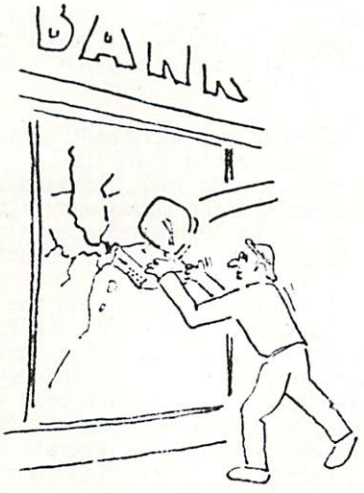


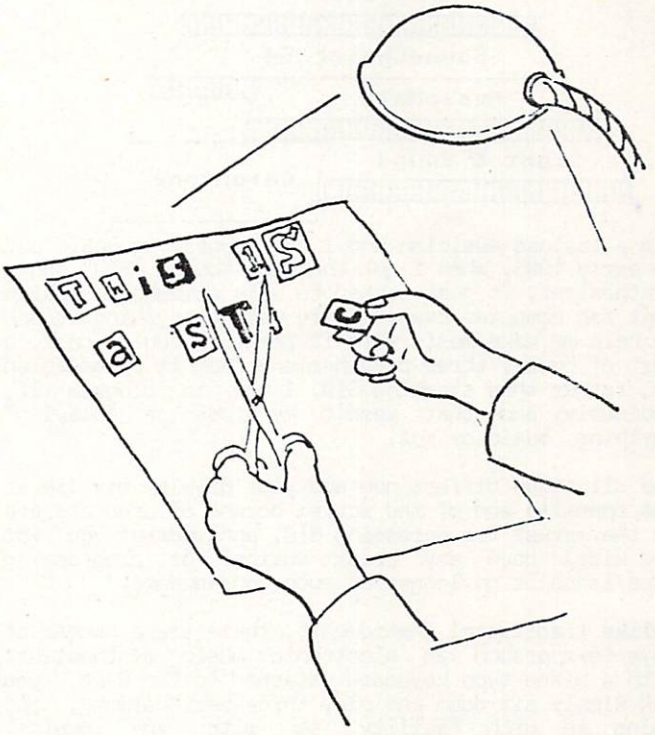
DON'T LET THIS HAPPEN TO YOU



BANK ROBBERY

MODERN THIEVES USE COMPUTERS TO PENETRATE BANK SECURITY





THE CRIMINAL APPLICATION OF WORD PROCESSING

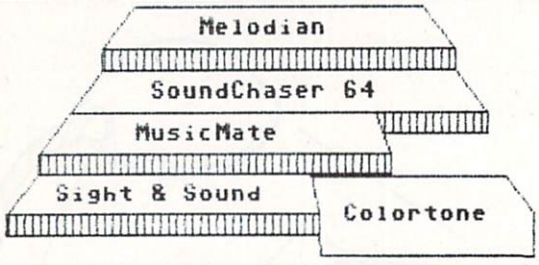
SOUND ADVICE

by Peggy Herrington

ALL ABOUT KEYBOARDS

Beginning this issue, Peggy Herrington will be bringing her considerable expertise as both a musician and Commodore 64 enthusiast to a new INFO column, "Sound Advice".

Peggy, a frequent contributor to several Commodore-oriented magazines, will keep us up on the latest & greatest in the world of sound & SID, music & noise in the months to come.



I'm a trained musician and I can program in BASIC but in early 1983, when I got the much-touted "SID" sound synthesizer, it just seemed to sulk somewhere inside that tan computer case. There wasn't anything around to help me make music with it then. I could coax a sort of buzzy, three-part harmony from it on occasion but rather than stroking SID, I had to program it, tediously, and that wasn't my idea of "playing" anything, music or not.

The situation differs now and your problem may lie at the opposite end of the scale: dozens of products are on the market for accessing SID, and whether you (or the kids) have any prior musical or programming experience is no longer of much consequence.

Unlike traditional instruments, there are a number of ways to approach an electronic music synthesizer. With a piano-type keyboard attached to the C-64, you CAN simply sit down and play three-part harmony, but doing so with facility, as with any musical instrument, requires practice - something most of us avoid like the proverbial plague. Besides, there's nothing that says you have play a synthesizer that way unless you want to.

It's true that synthesizers (SID included) can mimic traditional instruments along with making sounds no one has ever heard before but that's not the only reason they are revolutionizing our music industry. Synthesizers are tremendously easy to play as compared to traditional music instruments. So easy, in fact, that some professional musicians are worried about it. They're wondering out-loud if the day of the virtuoso, the guy who devoted his life to developing technique on a violin or piano, is gone. Not only that: an electronic music studio operated by one person can produce sound-tracks that used to require a group of performing musicians - and do it much quicker.

NOBODY DOES IT BETTER

Nobody does it on a typewriter keyboard, either. Black-and-white piano keyboards are attached to synthesizers because they're familiar and relatively easy to manipulate. Six musical keyboards are on the market for the C-64. Four offer full-sized piano keys (in units of varying numbers) and you'll probably have to rearrange your equipment to accomodate any of them. A less traditional item is a plastic keyboard overlay that snaps onto the C-64 and activates the top two rows of the C-64 as you press its miniature black-and-white keys. Another is a flat, touch-sensitive membrane lap-pad that only looks like a keyboard. Any one of these devices will transform your C-64 from computer to musical instrument.

A keyboard doesn't add any sound-making capability to SID, it simply makes what's there easier to get at. But before you dismiss the idea, consider the fact that your car doesn't alter topography either: like a keyboard, it just makes things more accessible, with different models offering different luxuries.

Actually, it's the program running on the C-64 that determines the luxuries a keyboard offers; what it can and cannot do. And naturally (in this industry anyway), the programming is not interchangable from keyboard to keyboard. The software that comes with most of them is performance-oriented (for playing live) and often you have to buy separate software for the luxuries - things like recording what you play live, sequencing, saving your sounds to disk and/or combining music with graphics.

SoundChaser 64

With four octaves of (49) full-sized piano-type keys, **SoundChaser 64** from **Passport** Designs is the biggest keyboard available and offers the smoothest key action of the bunch. It plugs into the C-64 cartridge slot. The software on the disk that comes with it displays SID control panels and is performance-oriented (which means you can't save your music to disk) and has two "modes" of operation. In polyphonic mode, the five supplied pre-set instrument sounds are changable and you can play three-part harmony live, using one instrument sound for all three voices. In monophonic mode, you can play only one "note" at a time (all three of SID's oscillators are being used) but Good Golly, Miss Molly! the 13 pre-set sounds provided are simply fantastic! You won't believe it's SID when you hear **"echo bells", "funkatron", "rain storm"** or **"fat fifth."**

In order to do anything but play live with **SoundChaser,** you will need **MacMusic** (**Passport**'s stand-alone software which works with the keyboard or accepts joystick input in a less traditional approach to music.) **MacMusic** allows full access to all of SID's special features as well as your disk drive so you can save your compositions. On-screen icons and pull-down menus (featured on the Apple computer this program is named after) guide you through this full-featured composition program. Each of SID's three voices is recorded separately all the way through a piece of music on a "track" (to differentiate instrumentation between them) and then "overdubbed" to sound with the others. With **MacMusic,** you can flip recorded tracks horizontally or vertically, transpose them to another key, cut, copy, insert or replace notation or change instrumentation in mid-measure, design your own instrument sounds or use any of the 13 pre-sets. The on-screen music notation isn't quite standard: durations are indicated by the length of colored blocks on a traditional music grand staff, and you can simply "draw" musical ideas by moving the joystick around - a wonderful visual display of voice movement. Ten sample songs by popular performing artists (**Vangelis, Michael Jackson** and **The Police,** for example) can be played, studied and/or changed. In short, **MacMusic,** with or without **SoundChaser 64,** looks like a winner!

Melodian

The next biggest keyboard, with three octaves or 40 black and white piano keys, is from **Melodian,** Inc. (A caveat: select a keyboard by the software that controls it; the number of keys is of secondary importance because where it sounds over SID's eight-octave range can be changed during play.) The case is off-white and oversized - it's a bit cumbersome - and it plugs into both the C-64 user port and joystick control port 2. This is the first keyboard that made it onto the market for the C-64 and it's a recording studio "par excellance." You record voices one at a time on tracks, very slowly with an optional metronome, and then adjust the overall tempo and instrumentation while listening.

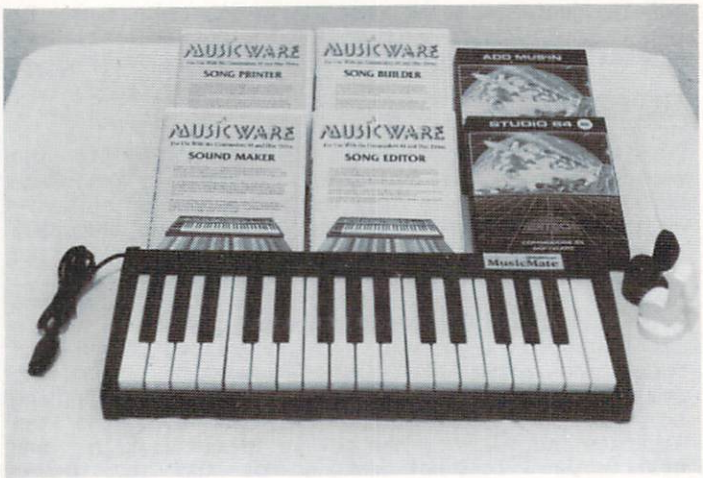
If you can (or want to learn how to) read standard music notation and tranfser sheet music onto the C-64, the software that comes with the **Melodian** keyboard, called **ConcertMaster** (which will work without the keyboard, too) is a good place to start. A single, colorful control screen divided into windows scrolls standard music notation as the music plays (notes line up vertically between voices although the durations are all shown as eighth notes). It also shows a menu for the function keys which operate eveything, a track control window where you record, mute, playback, etc., a feature window where you select and adjust volume, octaves, load or save files and see the disk directory, and includes a graphic representation of the keyboard upon which keys change color as notes sound. There are no editing features so if you blow it, you have to re-record an entire voice. But the documentation is exhaustive and 35 good sample songs are provided.

MusicMate

Editing your music to absolute perfection is the strong point with **Sequential Circuits' MusicMate** keyboard provided you have their four extra software packages. The keyboard itself is small but adequate, offering two and a half octaves of 32 full-sized piano keys, and it plugs into C-64 joystick control port 1. Again, the program with it is performance only, and shows SID control sliders on-screen and a little graphic keyboard. You can record three-part music and alter the eight acoustic instrument pre-sets during playback but you can't save anything to disk. The screen display with this and the separate software packages is plain-vanilla and utilitarian - it's not designed for fun and games: the entire series combines to form an extremely versatile, power-packed music composition tool, ala professional synthesizer systems. You have full access to SID and your disk drive.

Sound Maker (separate software from **Sequential**) lets you design complex instrument sounds with **MusicMate. Song Builder** is a sequencer with which you can record (from the keyboard) up to eight sections of music (with three voices, each of differing tempos) and link them together to form a "song" of up to 16 sections in any order. **Song Editor** puts all this into standard music notation on the screen and allows finely-honed music editing, and with **Song Printer** (and a dot matrix printer) you can print sheet music. There's only one (I think it's original) sample tune provided and it's on each and every disk in the series but it kinda grows on you.

If this sort of music tool doesn't appeal to you, take heart. The **MusicMate** keyboard is compatible with another composition package that IS fun and friendly: **Studio 64** from **Entech.** **Studio 64** is composition oriented and was one of the first programs available for the C-64 but it has been updated so often you'd never know it. (If you have an older version, contact **Entech** for an update - they're cheap! The latest version will work without the keyboard too, but note input is done by playing the C-64 ASCII keyboard like a piano, and that's not a very musical experience.) Voices are recorded separately on tracks and standard music notation is displayed on the screen for only one voice at a time, but **Studio 64** has so many fine composition features that won't bother you. You can make every note a different sound if you wish, and, with a utility program from **Entech** called Add Mus'In, **Studio 64** music files can be added as background music to your own programs with no effect on animation or timing. Over a dozen sample tunes are provided and it offers "human" and "swing" timing adjustments to help overcome that mechanical feeling of computerized music.



Music Port

I wasn't able to play with a production model of this 2-1/2 octave (32 key) full-sized piano keyboard attachment (available with or without light pen and appropriate music composition software). I did try **Tech Sketch**'s pre-production software without the light-pen feature with a "similar" keyboard. I've only seen the light-pen composition demonstrated: the pen is used to pick up notes, etc., in one area of the sreen and drop them onto a musical staff in another. It's similar to joystick note entry but easier since you don't have to drag an arrow around the screen.

The **Music Port** keyboard itself is precisely the same unit as that offered by **Sequential Circuits** (but the software isn't compatible; this one plugs into the C-64 user port.) It comes with bundled performance and composition software: the works. The performance program includes pre-recorded two-voice rhythm and bass sequences you can play along with live, and a nifty feature that lets you use the lowest musical keys to make the tone center of the bass-line follow your melodic progression. (Musicians will know what I'm talking about, and non-musicians will find it very handy with a little practice.) You can load in 120 different instrument pre-sets, acessing 15 at a time and use them or design your own for live play or when you overdub tracks. In composition mode lots of notes are displayed on the screen; only the three sounding at one time are displayed during playback. You can also play or record three voices at one at a time. It has full SID control and disk drive access.

I should be gaa-gaa over this keyboard... but I'm not and I can't say exactly why. It is extremely versatile and comes with all the software you'll need but a plethora of mismanaged details detract from the overall effect: the documentation isn't easy to read, the screen displays are stark or cluttered, all eight of the music samples are poorly chosen and unimaginativly arranged - but, admittedly, I did have pre-release product. Maybe the final package with light-pen composition will make up for it. I'll let you know in a future column.

Colortone Keyboard

This isn't a real keyboard, it's **Waveform**'s flat, touch-sensitive lap-pad with shaded graphics of 25 keys (two octaves) that make it look like it has movable keys. It plugs into control port 1 and has a "Touch Harp" or sensitive-strip that you can load scale patterns into and play by running your finger across, and 14 non-sounding function "keys" for changing program parameters. The software that comes with it is very limited while being lively and colorful (my two pre-schoolers adore it) although it doesn't allow true music composition or full performance. Icons on the screen correspond to the 14 function keys, which you touch to do things like change the two-voice pre-recorded accompaniments (which you play along with on the keyboard: the underlying premise of the program). You also select instrument pre-sets, record and save your melodies to disk, slow everything to half-speed or disable keys on the keyboard so that only those which lie within the scale of the selected accompaniment can sound - voila! no sour notes! The rest of the display shows scrolling music notation.

The **Colortone Keyboard** is fully compatible with **Waveform**'s deluxe but complex **MusiCalc** composition software which allows full SID and disk drive access for single-voice live play with recorded sequences and recording of separate tracks with non-standard music notation. About a year ago, **Waveform** announced a full-fledged piano keyboard attachment for the C-64

called the **Colortone Pro** - with a **Touch Harp** and 37 full-sized piano keys - but it turned out to be prohibitively expensive and will not be marketed. Too bad: it was a real beaut!

Incredible Music Keyboard

This little number is a tribute to the idea that good things come in small packages. Rather than plugging into the C-64 it perches on top of it, and by pressing the 24 miniature black and white piano-type keys, you activate the top two rows of the C-64 ASCII keys which lie directly underneath. **Sight & Sound's Incredible Music Keyboard** (upgraded software available to present owners for $7) will never rival **Steinway** for performance but you may be astonished by the grand music you CAN make with it. The trick is in the software: six separate packages plus four "albums" are compatible with it, all from **Sight & Sound.**

The disk that comes with the keyboard overlay has programs on both sides. You also get two books of music in standard notation and stickers with note letter names you can put on the keys of the keyboard overlay. Both programs are performance-oriented and the **Bonus Program** (on side two) gives you five preprogrammed rhythm/bass accompaniments to play along with: boogie, rock, disco, reggae and samba, and 20 pre-set instrument sounds to use. Three notes at a time are displayed on the screen, and you can change pre-sets while recording but you will need additional software to save music or pre-sets to disk.

I demonstrated a number of music and voice products at a Commodore user group meeting a while back, and the hit of the "show" was the **Sight & Sound's Kawasaki** Rhythm Rocker, with the keyboard overlay. There's nothing classical about this performance-oriented program by jazz guitarist **Ryo Kawasaki** (which also lets you record music in this format and save it to disk). You play one voice (either synthesizer, bass or percussion) live against pre-recorded two-voice electronic rhythmic sequences while (controllable) high-resolution graphic designs scroll across the screen. Pitch bend, sustain and vibrato effects are easily added during play, and several gutsy people at that meeting with no musical experience whatsoever were able to make dynamite music with it on the spot. The upgraded version (available to owners of the original for $15, which I didn't have then) is a double-sided disk with a music notation system, print utility and other goodies.

The **Kawasaki Synthesizer** is a separate two disk package with an oriental flavor. It works with the keyboard overlay, too. (All of **Sight & Sound's** software can be used without the keyboard overlay by playing the top two rows of the C-64 like a piano, but I don't recommend it.) **The Performer** disk lets you play along live with one provided sequence or play all three voices live from the keyboard at once, polyphonically. Twenty-one instrument pre-sets are given and you can change them to make over 500 altogether - but write down the good ones because you can't save them to disk for next time.

Designing and saving pre-set sounds and composing any style of three-part music are both available with **The Composer** (on the second disk in the **Kawasaki Synthesizer**). This is the only music program I know of for the C-64 which includes a "split keyboard" - which gives you the ability to assign half of the keyboard to one range of the SID chip and the other half to another for play or recording: a truly professional feature. You record in sequences of 255 notes, one voice at a time (the screen displays non-standard alphabetic notation) and then arrange or link sequences together in any order for playback. Full SID and disk drive access is there.

C64 Music Videos

Would you like to create music videos on your C-64? You know, high-resolution animated graphic displays with music in the background. It's easy to do with the following two software packages from **Sight & Sound.**

The **Music Processor** is a music composition program that works with the **Sight & Sound** keyboard overlay and an optional joystick. It includes 99 unchangable pre-set instrument sounds which you can cycle through while the music plays. You create music (and save it to disk) either by recording it from the keyboard overlay, the C-64 keyboard or typing it in alphanumerically in an extensive resident music editor (which allows, among other things, musical ties, sharps, flats and naturals, staccato or legato notes, and lyrics to be displayed on the screen under 3-note-at-a-time standard music notation). Music entered from the keyboard overlay (or any of the 14 sample songs) can be listed and edited in the edit mode. The upgraded disk ($15, if you own an older version) offers another music notation system and a utility for printing sheet music.

SOUND ADVICE cont'd

Sight & Sound's **Music Video Kit** does for graphics what the **Music Processor** does for music. With the prorams on the three disk-sides that come with it, you can design and combine music and graphics into C-64 music videos. Selecting from a library of 26 high-resolution screen backgrounds and 60 sprite characters (using up to seven at once) you design an animated graphics display. You can also design your own backgrounds and sprites (or alter theirs) with the resident **Graphics Editor** program. You then select the background tune from 17 songs on the **Video Kit** disks, from your original recordings done with the **Music Processor** or one of the 14 sample songs with that disk. Music files from **Sight & Sound**'s **Computer Song Albums** (which stand-alone and have eight different songs on each) are also compatible: On Stage, Rock Concert, Solid Gold and Music Video Hits. When you move the sprites (one at a time with a joystick) around the background in coordination with the music, everything is recorded automatically. Your music video could feature a rock group performing on-stage, for example. Without creating a single thing of your own, you can pick from 26 (gorgeous) backgrounds, 60 animated sprite characters and - counting the albums - 63 songs to use in your own music videos. I think THAT'S incredible!

Sight & Sound offers yet another package that is compatible with the keyboard overlay, **3001 Sound Odyssey.** Two programs are on one disk: an interactive synthesizer tutorial which will help you figure out (and let you fool with) waveforms, ADSR envelopes, ring modulation, synchronization and modulation (and other effects) as they are used in the accompanying music composition program, Microsynth. The latter's screen display includes current SID settings and cycles through sequences as they sound, with 100 available pre-sets which are shown visually, too. It's a different breed of composition program using the keyboard overlay monophonically but you can play (and save to disk) sequences of chords (or notes) by pressing a single key on the keyboard overlay.

THAT'S (not) ALL FOLKS!

Music and voice products for the Commodore-64 have been exploding onto the market lately, and I'm gonna give you the score on them in future columns, too. Distributors are asked to send review copies of new products which access SID to my attention at INFO-64 editorial offices or contact me at (505) 243-0449.

MORE ADVICE

Covox has come up with a new way to make music on the C-64: as you sing or whistle into the microphone (which comes with the **Voice Master**) your voice is digitized and the pitch is extracted. It is used with (changable) instrument presets to play your tune, and - get this - it happens so fast, **SID** seems to play right along with you as you sing. Concurrently, music notation scrolls on-screen and can be saved to disk or printed out. **Voice Master** will accomodate only one voice now but software developers are nuts if that isn't changed ASAP. Marvelous musical potential in this voice digitizer/recognition unit.

Sour notes: **Bank Street Music Writer (Mindscape)** and **Music Construction Set (Electronic Arts)** have terminal (in the dead sense) translation problems. Designed for **Atari** and **Apple** respectively, neither allows access to many of **SID**'s special features. Don't waste your time and money. If joystick note entry appeals to you, get **MacMusic** or...

On-screen music composition with a joystick is handled superbly by a new program from **Broderbund: The Music Shop.** Icons and pull down menus with dialog boxes over a display of eight or so measures of standard notation, full **SID** and disk drive access, print utility, quality documentation and 28 tuneful sample songs make **The Music Shop** one of the strongest programs of its type to come along yet. (It will soon be **MIDI** compatible).

Programmers (hobby and professional alike) will be thrilled with **Allegro** (formerly called **PASS**) from **Artworx,** which contains **FORTE,** a music composition language derived from **FORTH** with bits of others (for good measure?). Music input is compiled into interrupt-driven ML files which can be added to existing programs without interfering with screen action. You can do it alphanumerically or in "real-time" from the C-64 keyboard (or with **Sight & Sound**'s keyboard overlay), playing one to three voices at once. Design your own or use the 50 marvelous instrument presets with preprogrammed effects like wah-wah, pulsewidth sweeps, sirens, echoes, heavymetal and phaser. A separate Sampler disk has 40-plus files of gorgeous, "musical" music - you'll hardly believe it's **SID**!

INDEX TO VENDORS MENTIONED IN SOUND ADVICE

ALLEGRO ($39.95)
Artworx Software
150 North Main St.
Fairport NY 14450
(800) 828-6573

THE MUSIC SHOP ($44.95)
Broderbund
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

VOICE MASTER ($89.95)
Covox, Inc.
675-D Conger St.
Eugene, OR 97402
(503) 342-1271

MUSIC CONSTRUCTION SET ($39.95)
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

STUDIO 64 ($39.95)
ADD MUS'IN ($39.95)
Entech
10733 Chiquita St.
Studio City, CA 91604
(818) 768-6646

MELODIAN KEYBOARD ($199.95)
CONCERTMASTER (separately $39.95)
Melodian, Inc.
115 Broadway, Suite 122
New York, NY 10006
(212) 406-5163

MUSIC PORT KEYBOARD ($149.95)
Without Light-Pen ($119.95)
Tech Sketch, Inc.
26 Just Road
Fairfield, NJ 07006
(800) 526-2514

BANK STREET MUSIC WRITER ($49.95)
Mindscape Inc.
3444 Dundee Road
Northbrook, IL 60062
(800) 221-9884

SOUNDCHASER 64 ($199.00)
MACMUSIC ($49.95)
Passport Designs, Inc.
625 Miramontes Street
Half Moon Bay, CA 94019
(415) 726-0280

MUSICMATE KEYBOARD ($99.00)
SONG BUILDER ($39.95)
SONG EDITOR ($39.95)
SOUND MAKER ($39.95)
SONG PRINTER ($39.95)
Sequential Circuits, Inc.
3051 North First St.
San Jose, CA 95134
(408) 946-5240

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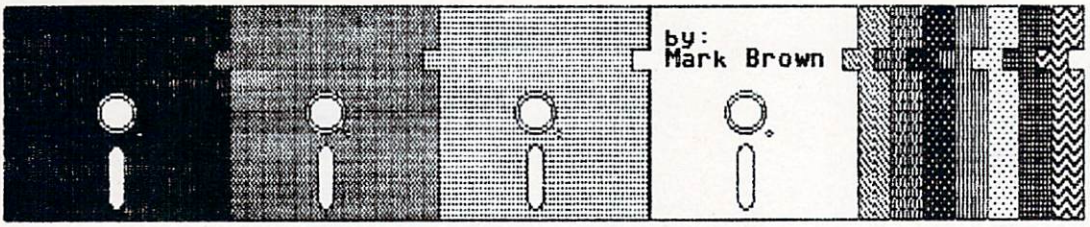
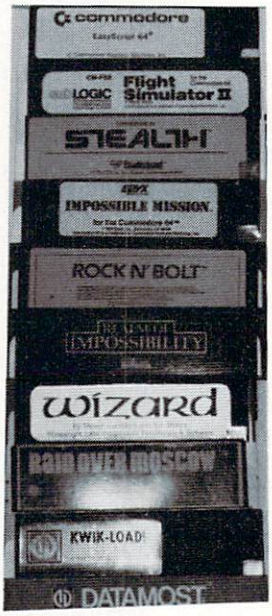
KAWASAKI RHYTHM ROCKER ($29.95)
KAWASAKI SYNTHESIZER ($29.95)
MUSIC PROCESSOR ($29.95)
MUSIC VIDEO KIT ($39.95)
COMPUTER SONG ALBUMS ($14.95 each)
3001 SOUND ODYSSEY ($29.95)
Sight & Sound Music Software, Inc.
3200 South 166th St.
New Berlin, WI 53151
(800) 558-0910

COLORTONE KEYBOARD ($39.95)
MUSICALC I ($29.95)
MUSICALC II ($19.95)
MUSICALC III ($19.95)
MUSICALC TEMPLATES ($9.95)
Waveform, Inc.
418 Buchanan Circle #12
Pacheco, CA 94553
(415) 825-1722

DISK COPIERS COMPARED





Armed with a stack of disks containing the latest and most heavily copy-protected games known to man, I retreated into my sanctum sanctorium to perform the most terrifying ritual of the ages. Three weeks later I crawled out of my cubicle, haggard, weak, blinking blindly at the unaccustomed sunlight. But I had the answer to that question which the mystics have pondered since the beginning of time: **Which Disk Copy Program Is Best?**

THE CONTENDERS

I checked out seven of the most popular disk copiers: **Ditto, Superclone** (ne: Clone Machine), **Canada A/M, Ultrabyte, Mr. Nibble, Copy Clone XL,** and **Di-Sector.** Four others, **Copy Q, Copy II 64, Apollo** (which replaces **Gemini**), and **Diskmaker,** are either in the midst of revisions that are not finished yet, or just plain did not show up in time for this review for one reason or another. We hope to take a look at all or most of these in a later issue.

THE GAUNTLET

With the aid of **Those Knowledgeable About Such Things** we selected nine programs with varying levels of copy protection against which to pit our arsenal of copy programs. In guesstimated order of difficulty to copy (from least to most difficult) these were: **EasyScript** (Commodore), **Flight Simulator II** (sublogic), **Stealth** (Broderbund), **Impossible Mission** (Epyx), **Rock'N'Bolt** (Activision), **Realm of Impossibility** (Electronic Arts), **Wizard** (Progressive Peripherals), **Raid Over Moscow** (Access), and **Kwik-Load!** (Datamost). Note that most of these are games. Software publishers perceive games as the most pirate-prone software, so they tend to give them the most sophisticated protection. The first three programs use "previous-generation" copy protection. All the copiers tested would copy them. But the rest are recent releases incorporating the latest in copy protection schemes from a cross-section of the Commodore 64 software industry. We also made sure we were testing the most recent (and in some cases, just updated) versions of the copy programs. Copy protection (besides being lamentable in and of itself) is a never-ending battle, resembling nothing so much as the nuclear arms race. Each side is continually expending enormous amounts of time, money, and energy trying to outdo the other, in a contest that is intrinsically futile. But enough editorializing. Suffice it to say that we tried to test the best against the best.

THE CRITERIA

We looked at copiers not only to see if they copy (obviously the main question), but also to see if they're easy to use, what the documentation is like, how fast they work, etc. We then distilled this information down into the handy chart you see reproduced here. Hopefully, you'll be able to tell at a glance which copier is the one for you.

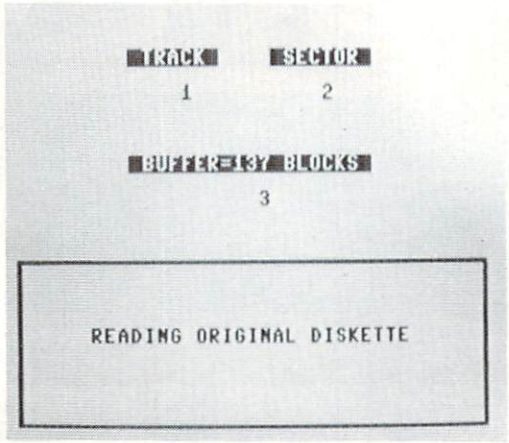
THE CAUTIONS

There are a lot of stone walls you can run into with disk copiers. The most notorious involves ROM incompatabilities. The 1541 disk drive has gone through several ROM revisions to correct minor bugs, and many copy programs are sensitive to this. We ran into problems with most of the copiers when we tested them on an early 1541 drive with the very first ROM version. If you have an older drive, these problems may show up with almost everything you try to copy, but usually they materialize only when you try to copy certain difficult programs, such as **Wizard** or **Raid Over Moscow.**

COPYRIGHT LAW ALLOWS YOU TO MAKE UP TO 5 COPIES OF A PROGRAM FOR YOUR OWN USE.

DISK COPIERS COMPARED

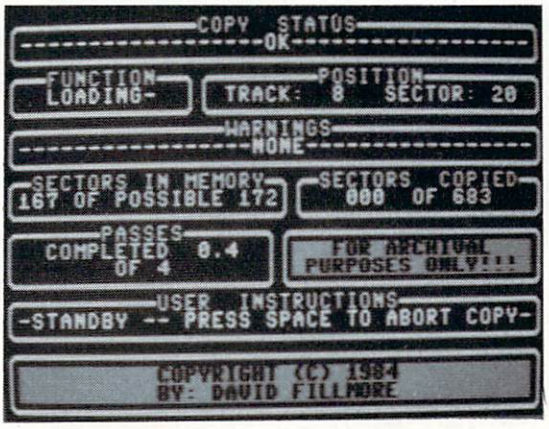
CONTINUED...



DITTO

SCREEN DISPLAYS RANGE FROM THE MINIMAL TO THE ELABORATE AS ILLUSTRATED BY THESE PHOTOS.

CANADA A/M



Other problems involve protection schemes that employ half-tracking or extra tracks beyond track 35. (Never mind that the 1541 is only designed to read faithfully out to track 35!) Many copiers will not handle these latest overkill techniques. In fact, a slightly out-of-whack 1541 will not handle loading them either. There is a simple solution to this problem: refuse to buy any programs with this degree of protection. (There's reportedly a new protection scheme under development that will actually wipe out the disk if it thinks it's an illegal copy. Of course, if it detects a spurious error and misinterprets it, it's too bad; your original is wiped out. We haven't actually seen this one used yet, and I hope we never do. I'll never buy any program protected like that!)

Successful disk cloning also depends on drive alignment, getting the drive door latched well, using good quality backup disks, the relative humidity, the Dow Jones Index, and Kismet. If at first you don't succeed, try, try again. Because of all these potential problems, you may be able to copy stuff we couldn't, and may likewise not be able to copy programs we could. There are no guarantees in life, only limited warranties.

PIRACY

We've said it before, but here it is again: **DON'T PIRATE SOFTWARE!!!** Lest you be confused about what piracy is, here is a concise definition: Piracy is copying something that somebody else owns the copyright to, and then giving or selling the copy to somebody else. The U.S. of A.'s **copyright laws allow you to make up to five** (Why so many? I don't know.) **copies of a program for your own use.** Disk copy programs exist solely for this purpose. Don't abuse them.

COMPARING THE PROGRAMS

Disk copy programs break down into just a couple of categories. First of all, there are novice and expert systems. The novice copiers let you make backup copies of disks and that's about all. Some of them allow you to diddle with the default settings a little bit, but you can't do any really fancy stuff. You follow the screen prompts to swap disks, and when you are done you have a workable copy (hopefully). And let's face it, this is most of what you buy a copy program for. The expert copiers give you more options. They usually let you examine disks and display which errors are located on what tracks, and then reproduce them on another disk. They generally include a track and sector editor. They probably have a single file copy routine, and other disk utility functions. These programs are for people who know what they are doing, and want to do more than just backup software.

more

DISK COPIER COMPARISON CHART

NAME	DITTO	CANADA A/M	DI-SECTOR	COPY CLONE	SUPERCLONE	ULTRABYTE	MR. NIBBLE
REVISION	1.4	2.3	2.0	XL	2.0	1/17/85	1.0c
PUBLISHER	Cardinal Sftwr.	Skylight Sftwr.	Starpoint	Edu-Comp	Micro-W	Ultrabyte	Full Circle
SPEED (FAST/SLOW)	S	S	S	S	S	F	F
LEVEL (NOVICE/EXPERT)	N	N	E	E	E	N	N (1)
DOCUMENTATION (0-10)	5	0	10	2	5	7	7
EASE OF USE (0-10)	8	9	9	5	7	9	9
OVERALL RATING (0-10)	7	3	6	5	8	9	9
# DISK SWAPS	5+ (1)	3	4	4	5	5	5
MAX # COPIES	1	1	1	1	1	5	5
BACKUP SELF? (Y/N)	Y (2)	N	Y	Y	N	N	N
WORK WITH 2 DRIVES? (Y/N)	Y	N	N	N	Y	N	N
MSD ? (Y/N/SPECIAL VER.)	N	N	N	Y	S	N	S
PRICE	$39.95	$39.95	$39.95	$19.95	$49.95	$39.95	$49.95
BACKUP COST	$17.00	$--.--	$--.--	$--.--	$--.--	$23.00	$10.00
UPGRADE COST	$--.--	$--.--	$--.--	$--.--	$--.--	$--.--	$12.00
SPEED (MIN/SEC F=FAILED)			(1)		(1)		
EASYSCRIPT	25/25	21/15	23/15	21/20	19/23	6/46	5/50
FLIGHT SIMULATOR II	15/27 (3)	20/40	23/21	21/32	18/58	6/36	6/34
STEALTH	25/12	22/10	24/30	21/53	21/19	6/38	6/37
IMPOSSIBLE MISSION	26/07	F----	F----	F----	19/36	6/40	6/58
ROCK'N'BOLT	24/46 (4)	F----	F----	F---- (1)	19/42	9/10	6/48
REALM OF IMPOSSIBILITY	24/34 (4)	F----	F---- (2)	F---- (1)	19/45	6/40	6/49
WIZARD	F----	F----	F----	F----	19/45	6/28	6/37
RAID OVER MOSCOW	F----	F----	F----	F----	F----	7/26 (1)	7/34 (2)
KWIK-LOAD!	F----	F----	F----	F----	F----	F---	F---
NOTES:	1) Additional disk swap required for each error track encountered. 2) Backs up itself to one generation 3) W/ 1541 Express and Fast Cable. 4) ROM problems copying ROI and RNB on old drive.	Nice display. no control over defaults	1) Can blank screen for a 15% time savings 2) E.A. Cracker crashed on ROI	1) Activision & EA Cracker did not work Very light documentation in prerelease copy	1) Can blank screen for 15% speed-up	1) ROM problems with old 1541. The only prog. tested that gave no audio prompt.	1) User definable defaults. has addt'l utilities 2) ROM problems with old 1541.

Canada A/M
Skylight Software
22 Miller St.
Belfast ME 04915

Di-Sector
Starpoint Software
Star Route
Gazelle CA 96034

Ditto
Cardinal Software
13646 Jeff Davis Hwy.
Woodbridge VA 22191

Ultrabyte
Ultrabyte
PO Box 789
La Canada CA 91011

Copy Clone XL
Edu-Comp
2139 Newcastle Ave.
Cardiff CA 92007

Mr. Nibble
Full Circle Software
PO Box 1373
Dayton OH 45401

SuperClone
Micro-W
PO Box 113
Pomptom Plains NJ 07444

DISK COPIERS COMPARED

CONTINUED...

Copiers also classify into fast and slow categories. The fast copiers use some version of the technique used in the widely available Four Minute Copy program, and can copy most disks in about seven minutes. To gain this speed advantage, you have to unplug everything else from the serial bus (printers, other disk drives, etc.) while you make your copies. Slow copiers use normal data transfer rates and take about twenty-five minutes to make a copy. This is no big deal if you are just making backup copies of a couple of disks (which is all you should be doing). It just gives you time between disk swaps to read an article in **INFO.** It's also possible to speed up some of the slow copiers with a 1541 speedup cartridge. **Ditto,** for example, runs almost twice as fast with Richvale's 1541 Express with Fast Cable, but is unaffected by Epyx's Fast Load. If you find other combinations that work, let us know and we'll pass the information along. In the meantime, here's how the copiers we tested stacked up:

DITTO

Ditto, from Cardinal Software, was one of the definite surprises in this test. It's a slow novice copier, but a very good one. It worked well on everything up to and including **Realm of Impossibility.** Only the three most difficult programs stumped it, and one of those (**Kwik-Load!**) stopped them all. **Ditto** is also unusual in that it will back itself up. **Ditto**'s technique for doing so is interesting, and one that may have some potential for other companies contemplating copy protection. **Ditto** only reproduces for a single generation. That is, the original disk will back itself up, but the copies won't. This scheme is somewhat akin to a software version of a "dongle", since the original owner can make as many backups as he needs, but stray copies can't go any further. The slim documentation is nothing to cheer about, but since this is a simple swap-and-go novice copier, that's not critical. **Ditto** will also work with two 1541 disk drives, which means faster copying for those with more equipment. Future upgrades are a pretty reasonable half-price at $17.00. All in all, **Ditto** is a good, simple disk copier from a company with a good enduser-oriented philosophy.

CANADA A/M

Canada A/M (since everybody wants to know, the A/M stands for Archival Maker) from Skylight Software is a comedown from **Ditto.** I'd heard about it for a long time, and was looking forward to checking it out. Our tests were disappointing, though. **Canada A/M** copied only the three programs with "last generation" copy protection; an update is sorely needed here. And since this is a slow novice level copier without even any documentation, there is not even any way to creatively supplement what it does with resident utility programs. The status display is probably the best of any of the copy programs listed here, but that's it. It was state-of-the-art six months ago, but the way copy protection schemes change, Skylight needs to be making copier upgrades available on a regular basis.

DI-SECTOR

Di-Sector is a slow expert system from Starpoint Software. The copy-protection scheme used by **Di-Sector** itself is unique. The master disk will make up to three working copies before it self-destructs, which should be plenty to last most people a long time. The documentation is excellent, and the disk is loaded with many useful menu-selected utilities. These include a track and sector editor, file copier, fast copy program, error analyzer, and even a disk monitor. The documentation, screen menus, and title displays are friendly and easy to get through. As an expert disk analysis and utility package, **Di-Sector** shines. Unfortunately, as a copier **Di-Sector** has the same problem as **Canada A/M.** With an upgrade to make it competitive, this would indeed be an excellent program, but right now it's a step behind.

COPY CLONE XL

Educomp's **Copy Clone XL** is the latest revision of their slow expert copy system. It copies itself 100%, which is admirable. The disk includes many disk utilities, including Zap Load (a 1541 speedup), a track and sector editor, error detection and writing routines, a disk monitor, and many others. The copy we tested was a pre-release version, so its final appearance may change somewhat, but what we saw had much the same look as **Di-Sector.** Many similar utilities are here, and the main copy routine provides a similar BAM-with-errors display. **Copy Clone XL** is not as slick-looking, however, lacking the friendly documentation and title screens. The status screens don't tell you as much, either. Also, most of the utilities must be loaded and run independently. Only the seven-function generic Disk Utilities package, the Fast Copier, and the Nibble Copier are available from the main menu. Unfortunately, this copier also lacks the ability to function with the latest and greatest protection schemes, but for somebody who wants a **Di-Sector** type program without copy-protection, and who can do without the slick presentation, **Copy Clone XL** is a viable alternative.

DISK COPIERS COMPARED

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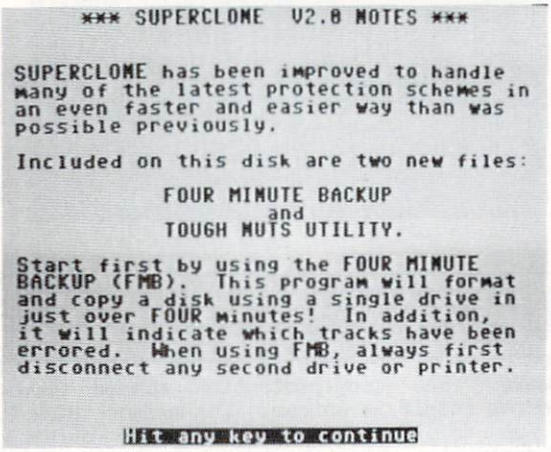

SUPERCLONE

Micro-W has upgraded their ponderous and unwieldy Clone Machine and come up with a much friendlier and more powerful **Superclone.** It will not back itself up, a philosophy that I find somewhat contradictory, but at least Micro-W has a history of reasonable upgrade cost and newsletter support. As this is being written, they are even offering upgrades at a dscount to purchasers of OTHER copy programs! The path taken to upgrade this slow expert system s a strange one, but it makes sense for this package; they've kept the original complex Clone Machine and Unguard programs on the disk and added the simple swap-and-go **Superclone** as well as the new Tough Nuts Utility. Unfortunately, they haven't upgraded the documentation. It only covers the old Clone Machine and Unguard. A simple help file gives some clues about **Superclone,** then gives way to a very strange "menu" screen that makes you cursor down to a preprinted LOAD and RUN on the screen for the initial program you want to run. From there on out, it is a simple matter of following more traditional (and effective) menus. **Superclone** is by far the best slow copier we tested, working well on all but the two most difficult programs. It even produced a working copy of **Wizard,** despite **Mr. Nibble**'s propaganda claims to the contrary. The arsenal of additional utilities is impressive, too. There is a track and block editor, error checker and writer, directory utility, file copier, and Tough Nuts cracker. Right now, **Superclone** is probably the most effective copy program available for those who want an expert system.

ULTRABYTE

Ultrabyte is a great copy program. It won't copy itself, but backups cost 50% of original cost. The documentation is slim, but since this is a swap-and-go fast novice system, that's fine; it does provide you with some tips on how to make good backups. The only input the user has to **Ultrabyte** is to specify how many tracks to copy (up to 38!) and how many copies you want to make (up to five at a time). From here on out, you just swap disks. **Ultrabyte** tied for most effective copy program with **Mr. Nibble;** both copied everything we checked except **Kwik-Load!,** and they both claim that nothing on the market can copy it. We believe them. **Ultrabyte** is ten bucks cheaper than **Mr. Nibble,** and copies the same stuff. The only thing that **Ultrabyte** does is give you good copies, fast.

MR. NIBBLE

Final Source's **Mr. Nibble** fast novice copier costs ten dollars more than **Ultrabyte.** For that, you get cheaper upgrades ($12.00) and backups ($10.00), an additional four-minute copier for unprotected disks, a fast file copier, and a fast formatter that will format a disk in nine seconds flat. **Mr. Nibble**'s latest revision includes the ability to make up to five copies at once just like **Ultrabyte,** and also copies up to 38 tracks. Half-tracking is user-selectable rather than automatic, you can select the track to start copying from, and you can ask **Mr. Nibble** to verify as it copies in exchange for a slight delay. **Mr. Nibble** copies what **Ultrabyte** does in about the same amount of time, but includes more bells and whistles. It's also got a nicer package, a cuter name, and neat little preprinted backup stickers with the mouse on them. You get a "**Mr. Nibble** Backs Me Up" bumper sticker and the "NibbleNotes" newsletter when you send in your warranty card, too. Their marketing people get an "A+" for sure.

SUMMATION

Like I said, copy protection is an arms race. I'd like to see everyone throw down their error tracks and half tracks and extra tracks and nibblers and nutcrackers and biteaters and just learn to live in peace, but I don't think it's going to happen. In the meantime, it's tough to keep up with things; today's supercopier may be tomorrow's also-ran. It's one part of computing that changes even faster than computing itself does. I hope this comparison has helped clear away some of the smokescreen.

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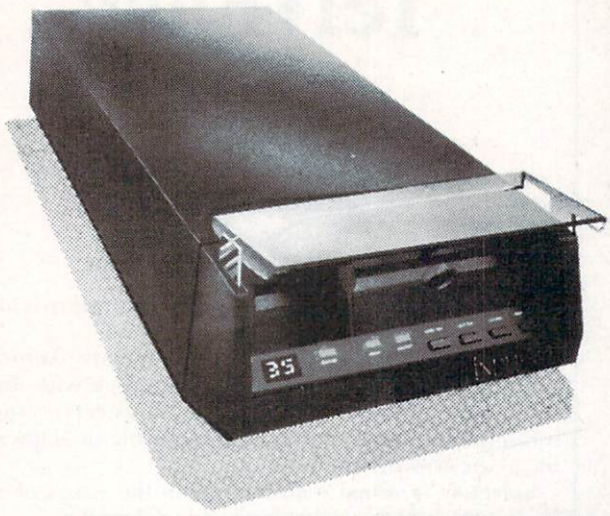

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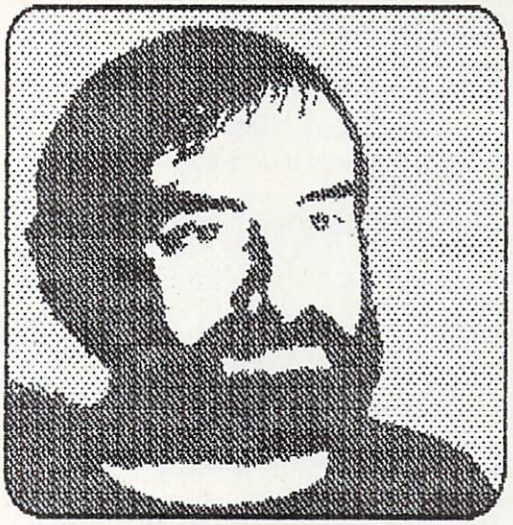
At home with the: C-128

by Benn Dunnington



By now you've probably read the ink right off the numerous pages published in numerous magazines describing **Commodore**'s new computer, the **C=128.** You probably have the specifications memorized, and have even got your lines rehearsed for when the moment comes to explain to your spouse, friends, relatives, parents etc. why you need to buy this new computer even tho you already have a mint condition **C=64!** So I'm not going to waste your time with the by-now-familiar facts and figures associated with the **C=128.** Rather, let's talk about what it's like rolling up the old sleeves and using the great **OFF-WHITE WONDER** in "REAL LIFE".

First let me say that, with only a few reservations, I am really impressed with the **C=128,** and the "NEW, IMPROVED" **Commodore** that is behind it. We have had the Beta unit here since the first week of May, **Commodore** promised it for the last week of April; **only one week late!.** Coming that close to a promised date is **absolutely unheard-of** from anyone in this industry, and could have been rounded-off to the **nearest year** with the **Commodore** of old!

OUT OF THE BOX

The **C=128** comes off the shelf with power supply, RF converter box for standard T.V. hookup, T.V. video cable, Introductory Guide, System Guide, CP/M Plus System Disk, CP/M Utilities Disk, and a C=128 Tutorial Disk (see photo right).
The **C=128**'s **power supply** (which was a weak spot with the **C=64**) is larger than the **C=64**'s, and stays cooler. Presumably it will handle more of a load as well.

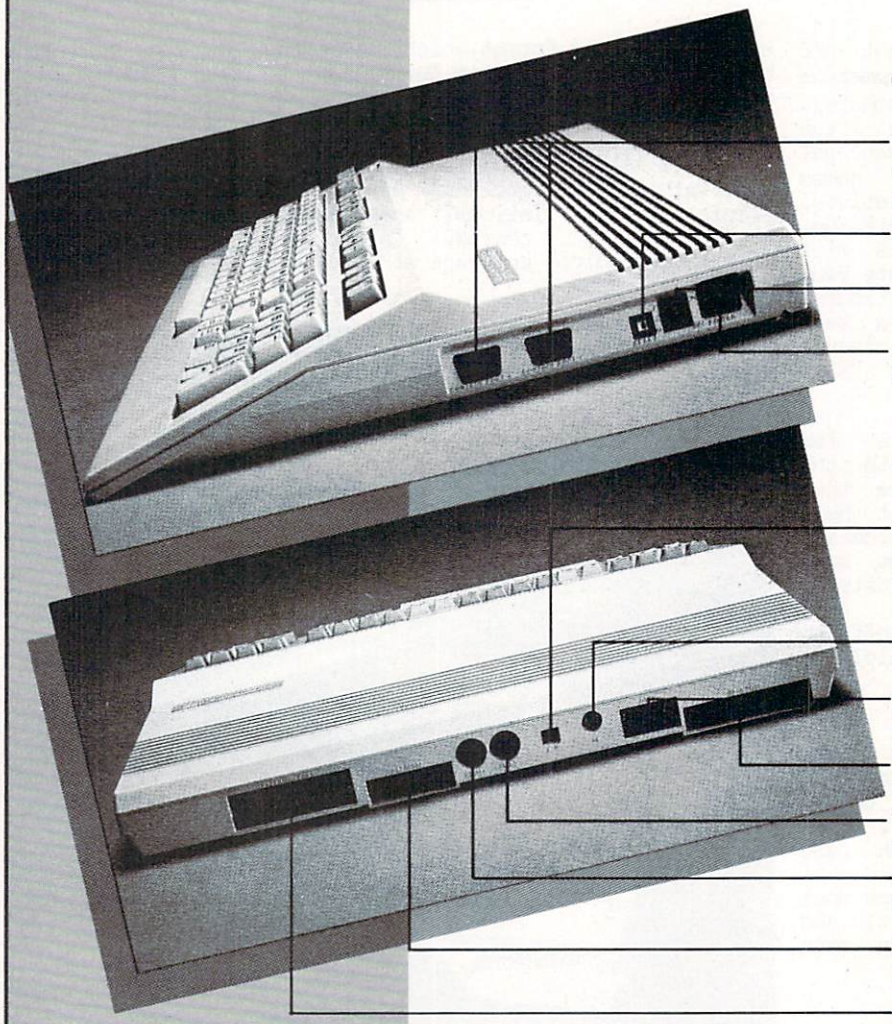
THE MANUALS

Commodore has really gotten its act together if the new manuals are any indication! The **System Guide** is a beautifully constructed and illustrated 400+-page tribute to **Commodore**'s new comittment to doing more than **just cramming chips in a cheap plastic box". the System Guide** is a pleasant size, with somewhat larger pages than the **C=64** Programmer's Reference Guide, allowing a thinner, easier to handle format which, combined with the twin-wire binding, makes the **System Guide** a joy to use. Remember the crude "blackboard-look" screen shots and illustrations in the **C=64** manuals? The **C=128** books are illustrated with 4-color photos, 2-color program side-bars, and quality technical illustrations thru-out. As for the contents: the material is well-organized, easy to find, with lots of sample program listings, appendices, command summaries, memory maps, charts, pin-outs, glossary, and "get-to-the-point" coverage of the many features of the **C=128.**

A LOOK AT THE COMMODORE 128

The Computer

Physically, the Commodore 128 resembles a typewriter keyboard enclosed in a light tan case. There are several switches, jacks and plug connections located on the right side and back of the case. This section identifies all these switches, jacks and connections (often called SLOTS or PORTS), and introduces you to the keyboard. For detailed information on using the keyboard, see Section 3 of the Commodore 128 System Guide (the other book packed in the carton with the computer).



The Right Side

CONTROL PORTS #1 & #2—Joysticks and other peripherals plug into these openings.

RESET SWITCH—Resets computer without turning it off.

ON/OFF SWITCH—Turns the power on or off.

POWER SOCKET—The POWER SUPPLY plugs in here.

The Back

CHANNEL SELECTOR SWITCH—Set television channel for viewing computer display (L = channel 3; H = channel 4)

RF SOCKET—Use this to attach cable from Computer/TV switchbox.

RGBI SOCKET—Plug RGBI monitor cable in this socket.

USER PORT—Accessories, such as modems, plug in here.

VIDEO SOCKET—Plug composite monitor cable in this socket.

SERIAL SOCKET—Connect disk drives and printers here.

CASSETTE PORT—The Datassette tape recorder plugs in here.

EXPANSION PORT—Software cartridges plug in here.

Sample page from Commodore's excellent C=128 Introductory Guide.
(shown full size)

At home with the:
C-128
continued...

A nice touch here is the inclusion of the **Introductory Guide** (see photo of sample page) which covers all that "what do I do next" kind of material that new owners used to spend hours trying to find in the **C=64** books (how to turn it on, make the various hookups, load and run software, enter & leave the various modes, use the many keyboard features, etc.). The inclusion of a tutorial diskette is also a milestone of sensibility which will be highly appreciated by all. My compliments.

THE KEYBOARD (mostly good news)

The keyboard is very stylish- I think it looks great, and puts the necessary visual distance between it and the **VIC** that the **C=64** lacked and to some extent kept it from being taken seriously by the **16-bit snobs.** The keys have a nice feel, with finger dimples on the "f" & "j" keys as well as the "5" key on the numeric pad for tactile orientation (your fingers know where they are without looking down.) On our Beta unit (and other people's we have spoken with) the left shift key tends to stick. Let us not dwell on the utter disaster it would be for **Commodore** to not have attended to this on the final production models.

One especially nice addition to the keyboard is the **Reset Switch** which enables one to restart the **C=128** without turning the machine all the way off and then on again.

A curious aspect of the keyboard, and one which may cause some people trouble initially, is the fact that the offset between keys on one row and the next is **double** what it is on the **C=64** (3/8" vs. 3/16"). It doesn't bother me, but for some people it has taken getting used to.

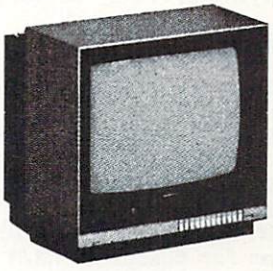
My one **BIG** gripe about the keyboard is that, for reasons which have been explained without convincing me, the designers chose to lock out the numeric pad (along with the other extra keys) when in the **C=64** mode. I'm not electronically literate, but I can't believe that there isn't some way to have the numeric pad active while still maintaining 100% **C=64** compatibility.

OK, I have another gripe: the keyboard is so low to the ground and comfortable to type on, that it really doesn't need an **ERG=BOARD** for comfort's sake (although we will probably design an "ERG=something or other" to hold ERG=CARDS!)

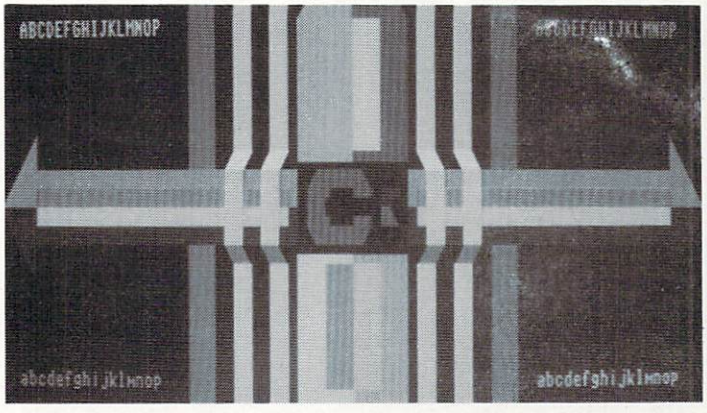
PORTS & SOCKETS

No, virginia, there is no IEEE port on the **C=128** (considering how often I am asked about this particular item, it would seem that **Commodore** should have included it). Yes, all the ports from the **C=64** are there plus an RGBI port for 80-column displays in **128** or **CP/M** modes. The power connector is square (like on the PLUS/4), but that is the only plug change.

Sears 57 KX 4084C
RGB/Composite Monitor/TV



Cover art on Sears RGB set



More

At home with the:
C-128
continued...

While the ports & sockets are the same shape as on the **C=64**, they are NOT in the same locations, & this will cause some major grief for certain people (minor grief for most) using certain products. For instance: the **Paperclip** word-processor dongle will not fit in joystick port #1 (where it must be) because of the way the case is recessed. Solution- get yourself a "joystick extension cord" and connect your dongle via this cord! (it looks silly, but it's the only way). Several devices that used to go in the Modem or "User" port (like **Computereyes**) will not fit there now if an RGBI cable is plugged in at the same time. Also, many expansion port devices (like **Batteries Included**'s **Buscard II** & **BI-80**) interfere with the new cassette port location (which is frequently used for interface power-taps and the like). Obviously, manufacturers will be taking these factors into consideration as they design **new** products, but there is going to be some grumbling and kludging and returning to the place of purchase for a while until it all gets straightened out. I imagine we will even see whole new product lines spring up that specifically address this problem (I can see it now; the ACME OCTOPUSS- "connects everything to everything...only $54.95).

THE MONITOR PROBLEM

What monitor problem? Well, if you have a 1701 or 1702 (I don't think the 1703 ever made it to market) you can't access the 80-column world of the 128 and cp/m modes (tho they both have (less useful) 40-column modes). If you have a composite monochrome monitor (the kind most of us use for 80-column work with our **C=64**'s), you will still not be able to use them for 80-column CP/M or 128 work (but they'll work fine with 80-column boards in the **C=64** mode). Even with **Commodore**'s new RGBI monitor (and you'll have to wait a couple months for it) you won't be able to use **C=64** 80-column output (since it doesn't have 80 column **composite** inputs, only RGBI 80 column inputs). The bottom line is that there is no single monitor (yet) that will handle everything that your **C=128** can put out! What can you do? The least costly approach that I've found (and this will get you in business today) is to pick up a **Sears 57 KX 4084C RGB monitor.** For only $340 you get a fine 13" RGBI monitor, which is also a composite color monitor, and an electronically tuned television as well! The composite stage is not as good as the **Commodore** 17xx series monitors, but the RGB is fantastic (the cover graphic of this issue was shot directly from 80-column RGB output on this monitor). Be sure to order Sears' RGB cable ($15) while you're at it, since the **C=128** does not come with this particular accessory. Now you have everything except 80-column **C=64** monochrome capability. If you need this too, then get a little Sanyo or Zenith green screen for under $100 and you're all set. (One thing to consider before you jump in the car and head down to Sears: the **Commodore 1902** RGB monitor $? has a tricky little switch on it marked "RBG Analog". I have heard that this is for use with the **AMIGA** and allows for a very sensational display not obtainable thru other types of monitor circuitry. So if you think you will eventually own an **AMiGA** too, you might want to hold out for the **Commodore** RGBI monitor.)

GRAPHICS (good news & bad news)

The good news is **BASIC 7.0** which adds numerous graphics commands (among other things) to BASIC allowing simple (anyone can do it) creation of boxes, circles, polygons, lines, fills, etc. and simplified creation & control of sprites. This version of BASIC only kicks-in in the 128 mode, and (here comes the **BIG RUB**) only in the **40-column mode!!** I was heart-broken to find that as my luscious field of 640 X 200 RGB pixels sat there in their full hi-resolution 16-color glory, there was no way short of MACHINE LANGUAGE to talk to them. (so, for me that means NO way to talk to them). What a shame! I hope we will see some 3rd party graphics software **soon** that will remedy this frustrating shortcoming.

128 MODE

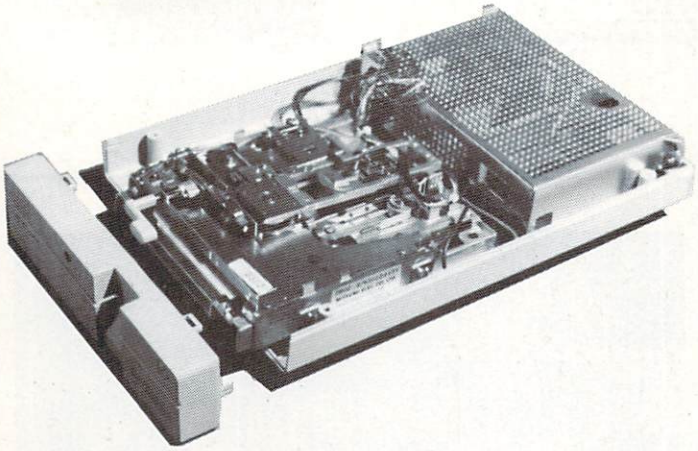
Other than the above mentioned graphics let-down, the **128 mode** is really quite impressive. **BASIC 7.0** is literally dripping with new and powerfull commands. I love the way it locates programming errors by displaying not only the offending line, but even hi-lites the offending word(s)! Proper renumbering and auto numbering are but a few of the enhancements you'll wonder how you lived without. You will also find that many BASIC programs (with hi-res graphics even) written for the IBM PC and PC JR will translate with little to no modification under **BASIC 7.0**! You will also like the **WINDOW** commands from either direct mode or from program control. Another nifty feature in 128 mode is the **"FAST"** command, which puts the 128 into overdrive (shifting from 1Mhz to 2Mhz) doubling the speed of certain operations.

CP/M MODE

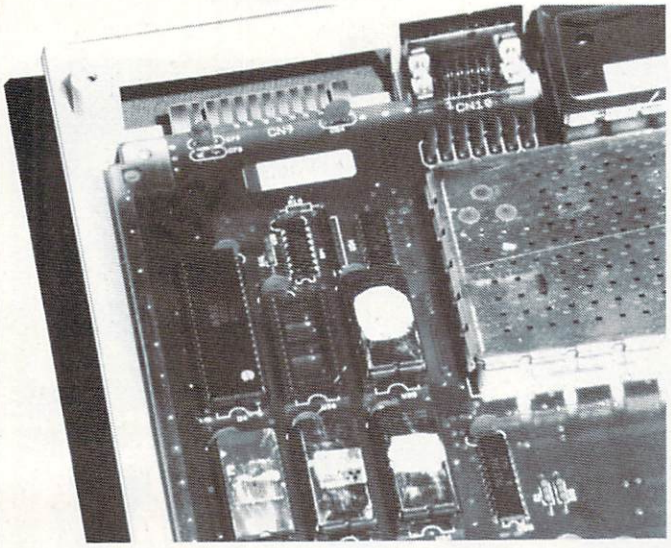
Well, it took some time, but after numerous revisions and upgrades, it looks like **Commodore** has been able to get the full **CP/M PLUS** side of the machine operational and compatible with subordinate versions of CP/M. This promises to be the real killer for the serious business and technical user with its 10X disk access, 16-color 80 columns, various terminal emulation modes (including ADM-3A , VT-52, & VT-100). We have been able to load and run some CP/M software (Kaypro format) while some titles refuse to load (also Kaypro format). One explaination from **Commodore** is that some Kaypro disks which will work fine with the Kaypro are not truly CP/M compatible programs (having a few odd-ball machine-specific routines mixed in) and therefore are "illegitimate" and thus won't run. OK. Looks like the INFO scouts will have their hands full sorting out this latest wrinkle in the world of SOFTWARE COMPATIBILITY.

If the ASHTON TATEs, MICROSOFTs, and other CP/M vendors of yore don't miss the boat, there could be tons of good, fast, powerful CP/M stuff at reasonable prices back on the shelves in short order (they just need to blow the dust off the boxes and remove those ridiculous price-tags). See Mark Brown's "Best of CP/M" article elsewhere this issue.

At home with the:
C-128
continued...



Inside the 1571 disk drive



The empty ROM socket-
Ready for GEM or ?????

DISK DRIVES

In the **C=64** mode, we have not found anything that isn't completely compatible between the two computers. The **1541, MSD,** and **Indus** drives worked identically on both machines. the **1571** works just like the 1541 in the **C=64** mode, but speeds up by a factor of 5 in the **C=128** mode, and a factor of 10 in the **CP/M** mode. The **1571** has a set of DIP switches in the back so that you may configure it as any device # from 8 to 11. It has a dual-sided head mechanism, allowing it to read both single and double sided disks. In **C=64** mode, it only uses one side. (I'm just guessing here, but that suggests to me the possibility of software routines that would allow the **C=64** mode to use the 1571 as a quasi-dual drive.) Both the **C=128** and **CP/M** modes use both sides of the drive for increased storage capacity. An interesting note: if you format a diskette in **C=128** mode and read the directory, you will see 1328 blocks free. If you then switch to **C=64** mode and pull a directory on the same diskette, you will see only 664 blocks free. I was able to load and save simple BASIC programs in each mode to and from the other. You can use your 1541 or other current drive to save your **C=128** programs (tho at the usual slow speed).

CROSS COMPATIBILITY

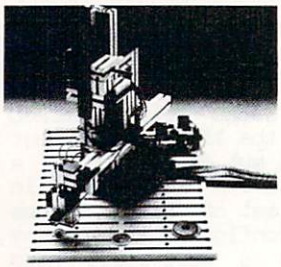
It looks like most peripherals for the **C=64** will work with the **C=128.** The exception here is the **EXPANSION PORT.** 64 cartridges (as you should expect) will not work in the **C=128** mode (their presence tells the machine to be in **C=64** mode.) Less obvious is the likelihood that most hardware devices using this port will also be useless in the **C=128** mode. The **Buscard II,** for instance, crashes the **C=128** mode, just by being in the socket, and will in no way allow, for instance, an MSD drive to be used as an IEEE device. We will undoubtedly see a new wave of products to fill this need, the most popular likely to be those which are functional in more than one mode.

THE MAGIC ROM SOCKET

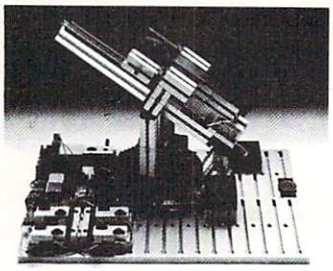
Inside the **C=128** there is one more surprise. Upon opening the **C=128** (if you have ever opened up a **C=64,** you'll appreciate the absence of interlocking plastic tabs -the ones that always broke off) you'll find an empty ROM socket in the "upper left" corner of the machine (see photo). The impression I get from various sources at **Commodore** is that this socket has been provided to allow for substantial future enhancements that might become desireable at some point in the future. One possibility acknowledged is eventually putting a **C=128** version of **GEM,** the MAC-like graphics environment (which has been ported to the IBM PC, and may also show up on the AMIGA and the Atari ST line), on the **C=128.** I like that idea. Having that empty socket there somehow makes me feel even better about the **C=128**- like it's open to improvement.

AVAILABILITY

Commodore was telling me as late as May 20 that the **C=128** would be in some stores before C.E.S. in Chicago (June 2-5). By the time you read this, you will probably be able to pick one up. Should you? For under $300 I think it's the buy of the year!



the FISCHERTECHNIK ROBOTICS LAB



by Benn Dunnington

The **Fischertechnik** robotics kit is a spectacular new product which was first shown at the Winter C.E.S. in Las Vegas last January & **INFO=64** was lucky enough to get one of the first evaluation units made available for review.

The kit consists of 3 main parts: the precision mechanical parts kit, the interface box, and the disk-loaded software.

THE PARTS KIT

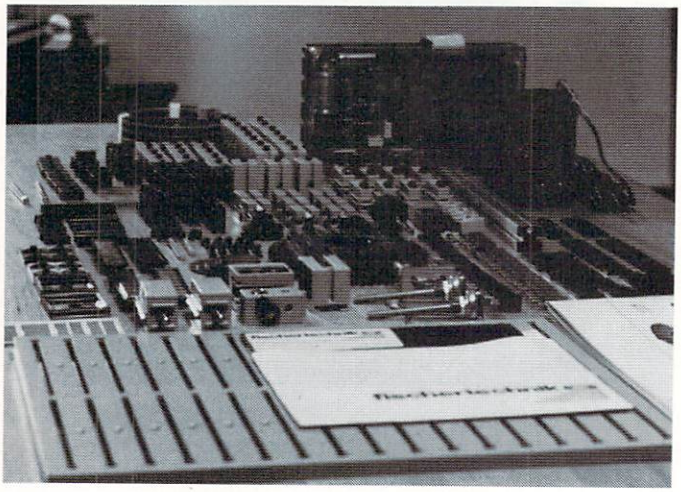
The first thing that impressed me upon receipt of this West German built robotics kit was the generous and varied array of small precision plastic and metal parts. I have previously worked as an R&D instrumentation specialist, and I can tell you that the parts kit is of the highest quality, and well worth the price of the whole system alone. Hundreds of cunning interlocking pieces including blocks, clips, gear boxes, motors, gear racks, shafts, plates, brackets, variable resistors (pots), an electro-magnet and more can be combined in an almost endless number of ways to build very strong and accurate mechanisms **without a single tool** (except for the little screwdriver, included, which is used solely for attaching wires to terminal plugs.)

THE MANUALS

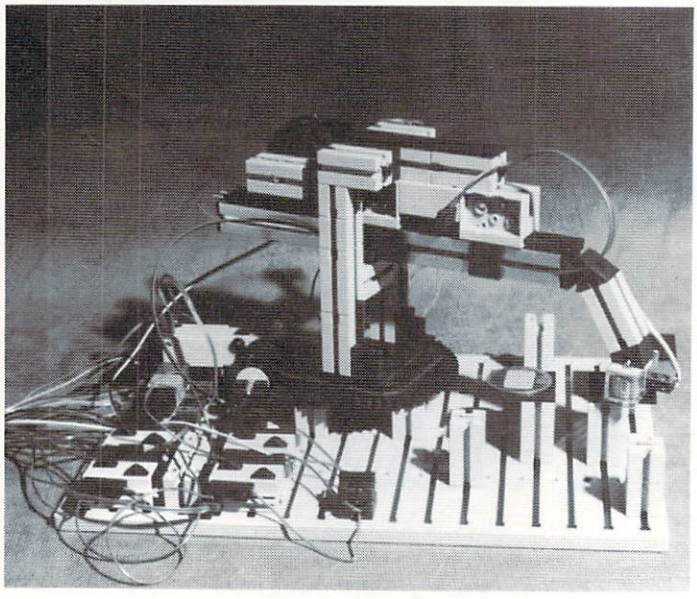
Fortunately, you will not have to expend much energy trying to discover what can be constructed with all this hardware: the folks at **Fischertechnik** have already worked out the details (and written the software) for 10 unique and instructive robotics projects. The main instruction book is a pictorial step-by-step guide which relies on very few words to explain the assembly processes. The excellent photographs and diagrams of the 40 page guide are easy to follow and prepared with the same careful detail as the parts themselves.

THE INTERFACE

To link the various motors, switches, lamps, and pots to the computer, a compact interface box is provided with channels for four motors, 8 switches, and two potentiometers. The interface also provides connections for DC power to the motors and lamps via a plug-in ac/dc transformer. The interface (which is housed attractively in a clear plastic box) connects to the user (modem) port, with a 20-pin connector & flat ribbon cable running to the robot model. Like the mechanical drawings, the electrical circuits are depicted in an easy to follow graphical format which even electronics novices like myself can follow.

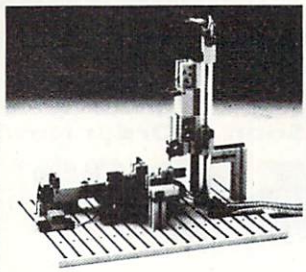
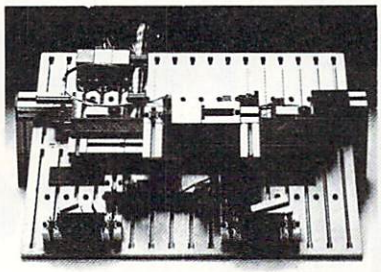
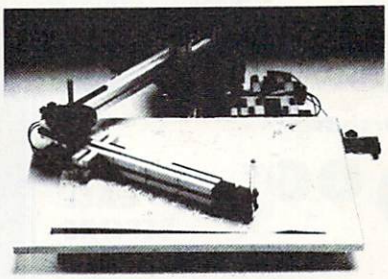
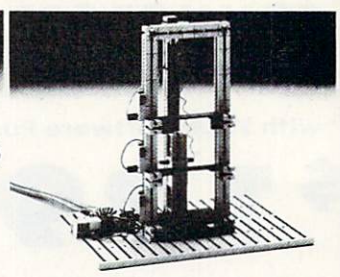
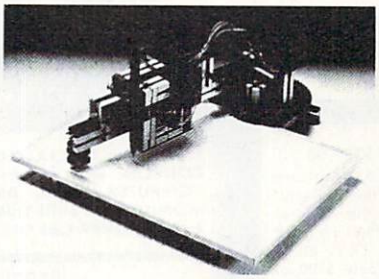
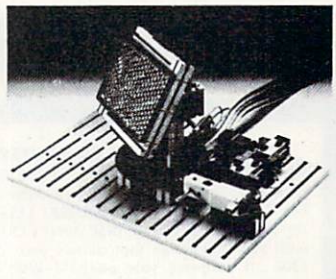


Parts, Parts, Parts



Editor's revised "Teach-in Robot"

more

THE SOFTWARE

A diskette is supplied with programs for operating each of the 10 sample robots which are documented in the kit. The review disk I worked with had yet to be translated from the German, so I was glad that the preliminary manual had English translations to guide me thru. Nonetheless, the software is pretty straightforward, written in BASIC, and worked smoothly with the models we built.

HOW IT WORKS

The first thing I did was lay out all the parts and familiarize myself with their appearance (while speculating as to their possible uses). I next flipped thru the manuals, reading descriptions of each of the 10 models, and deciding which one to build first. It took me about two hours to assemble the variation of the "teach-in robot" pictured here (I made the arm horizontal instead of angled down to avoid interferences with the platforms after my first clumsy program sequence nearly caused the robot to destroy itself by trying to move thru instead of around a platform!). Next you prepare the ribbon cable by separating and stripping the 20 color-coded wires, and fitting them with miniature plug ends which make connecting and changing wires with this kit a snap. The interface is plugged into the modem port, the power supply is plugged into a wall socket, and the connections are made to the various motors, switches, etc. on the model. Finally, the software is loaded & run for the particular model, and you are in business! My wiring didn't turn out as tidy as the publicity photos, but everything worked!

The 10 documented models included cover a wide range of electro-mechanical systems, all of which have practical counterparts in the real world. The care with which each model has been thought out and designed is highly appreciated and commended by this reviewer.

THE POSSIBILITIES

The **Fischertechnik** robotics lab is a treasure-chest of hands-on learning which has no rival (or competition) in the personal computing market. I know of no other product which invites the user to discover and explore the multiple worlds of robotics, electronics, logic, mechanics, programming, and the interaction between the separate parts in such a stimulating, rewarding, and enjoyable way. **I think every elementary school, high school, and college in the country should have at least one of these kits.**

This is a very important product in that it opens up a level of involvement, experimentation, and interaction with the computer that has not been acheived by any other approach. Think of the possibilities when you combine several of these sets together (you can also purchase more general parts kits from **Fischertechnik** which are compatible and can be used to expand the basic robot kit). Imagine interfacing your robot with a voice recognition system (see Ted Salamone's Speech article elsewhere this issue) and controlling your model with voice commands!

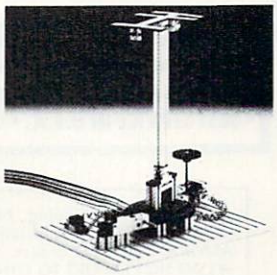
EASE OF USE / AGE LEVEL

While I have mentioned the ease of using various aspects of the **Fischertechnik** robotics lab, and would not want to discourage children from experiencing such a fascinating tool, this is basically an advanced kit often requiring adult strength and manipulative skills, along with considerable spatial perception during construction of the different models (I would place its difficulty level at about 3X that of LEGOs!). Kids should have access to these kits, but most under the age of 12 will need at least some assistance.

SUMMARY

The **Fischertechnik** robotics kit is a marvelous addition to the world of **Commodore** computing. From concept, to craftsmanship, to documentation, this product shines. Very possibly the best product ever made for the **C=64**, we can only hope that more companies will be spurred on to similar excellence by **Fischertechnik**'s example.

FISCHERTECHNIK ROBOTICS LAB (about $200)
Fischer America Inc.
175 Route 46 West
Fairfield NJ 07006
(201) 227-9283



COMMODORE 64

* with $19.95 Software Purchase

$139.00*

- 170K Disk Drive $149.00 *
- Tractor Friction Printer $159.00
- 13" Hi-Res Color Monitor $179.00 *

COMPUTER AND SOFTWARE SALE

CALL BEFORE YOU ORDER

PRICES MAY BE LOWER

C128 COMMODORE COMPUTER

NEW

(Coming Soon — Order Now)

$269.00*

- Computer Learning Pad $37.95
- Voice Synthesizer $49.00
- 12" Green or Amber Monitor $79.95
- 12" Daisy Wheel Printer $199.00

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER, DISK DRIVE, PRINTER, or MONITOR we sell! This coupon allows you to SAVE OVER $500 OFF SALE PRICES!!

* COMMODORE 64 COMPUTER $139.00

You pay only $139.00 (with the $19.95 software purchase, see below) when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your computer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied, your net computer cost is $39.00!!

* 170K DISK DRIVE $149.00

You pay only $149.00 (with the $19.95 software purchase, see below) when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your disk drive that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied, your net disk drive cost is $49.00.

* 13" HI-RES COLOR MONITOR $179.00

You pay only $179.00 (with the $19.95 software purchase, see below) when you order this 13" COLOR MONITOR with sharper and clearer resolution than any other color monitors we have tested! LESS value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your monitor that allows you to save over $500 off software sale prices!! With only $100 of savings applied, your net color monitor cost is only $79.00. (16 Colors).

80 COLUMN 80 CPS TRACTION/FRICTION PRINTER $159.00

You pay only $159.00 when you order the Comstar T/F deluxe line printer that prints 8½x11 full size, single sheet, roll or fan fold paper, labels, etc. Impact dot matrix, bidirectional. LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your printer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied your net printer cost is only $59.00.

80 COLUMN BOARD $79.00

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS 4 slot expander!

80 COLUMNS IN COLOR PAPERBACK WRITER 64 WORD PROCESSOR $39.00

This PAPERBACK WRITER 64 WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing. DISPLAYS 40 or 80 COLUMNS IN COLOR or black and white! Simple to operate, powerful text editing , complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! List $99.00 **SALE $39.00** Coupon $29.95

(Examples)

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Paperback Writer 64	$99.00	$39.00	$29.95
Paperback Data Base	$69.00	$34.95	$24.95
Paperback Dictionary	$24.95	$14.95	$10.00
Practicalc II	$69.95	$49.95	$44.95
Print Shop (Disk)	$44.95	$32.95	$26.95
Practicalc	$59.95	$24.95	$19.95
Programmers Reference Guide	$20.95	$16.95	$12.50
Programmers Helper (Disk)	$59.95	$29.95	$19.95
80 Column Screen (Disk)	$59.95	$29.95	$19.95
Disk Filer (by Flip-N-File)	$39.95	$14.95	$12.95
Deluxe Tape Cassette	$89.00	$44.95	$34.95
Pro Joy Stick	$19.95	$12.95	$10.00
Light Pen	$39.95	$14.95	$ 9.95
Dust Cover	$ 8.95	$ 6.95	$ 4.60
Simon's Basic	$29.95	$22.95	$19.95
Pitstop II Epyx	$39.95	$24.95	$19.95
Super Graphics Expander	$29.95	$22.95	$19.95
Music Calc 1	$59.95	$29.95	$24.95
Filewriter	$59.95	$29.95	$24.95

(See over 100 coupon items in our catalog)

Write or call for Sample SPECIAL SOFTWARE COUPON!

EXECUTIVE QUALITY PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of Business Programs for Commodore 64 Computers

Item	List	* Sale	Coupon
Inventory Management	$79.95	$29.95	$24.95
Accounts Receivable	$79.95	$29.95	$24.95
Accounts Payable	$79.95	$29.95	$24.95
Payroll	$79.95	$29.95	$24.95
General Ledger	$79.95	$29.95	$24.95

*The $19.95 Software Purchase Options

	LIST	SALE
1. 24 Program Bonus Pack (tape or disk)	$29.95	$19.95
2. Oil Barrons-Strategy Board Game	$49.95	$19.95
3. Disk Drive Cleaner	$29.95	$19.95
4. HES Games (disk)	$29.95	$19.95
5. Pogo Joe (tape or disk)	$29.95	$19.95

* C128 COMMODORE COMPUTER $269.00

We expect a limited supply the 1st week in July. We will ship on a first order basis. This all-new revolutionary 128K computer uses all Commodore 64 software and accessories plus all CPM programs formatted for the disk drive.
List $349.00. **SALE $269.00.**

SUPER AUTO DIAL MODEM $59.00

Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone, just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives. ***Best in U.S.A.***
List $129.00 **SALE $59.00.**

COMPUTER LEARNING PAD $37.95

Makes other graphics tablets obsolete. This TECH SKETCH LEARNING PAD allows you to draw on your T.V. or Monitor and then you can print whatever you draw on the screen on your printers. FANTASTIC!!!
List $79.95 **SALE $37.95.**

VOICE SYNTHESIZER $49.00

For Commodore-64 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY $19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk — ADD SOUND TO "ZORK", SCOTT ADAMS AND OTHER ADVENTURE GAMES!!
(Disk or tape.)

12" GREEN OR AMBER MONITOR $79.95

Your choice of green or amber screen monitor, top quality, 80 columns x 24 lines, easy to read, anti-glare! PLUS $9.95 for connecting cable. Com-64 or VIC-20.

PRINTER/TYPEWRITER COMBINATION $249.00

"JUKI" Superb letter quality, daisy wheel printer/typewriter combination. Two machines in one — just a flick of the switch. 12" extra large carriage, typewriter keyboard, automatic margin control and relocate key, drop in cassette ribbon! (90 day warranty) centronics parallel or RS232 serial port built in (Specify). List $349.00. **SALE $249.00.** (Ltd. Qty.)

CARDCO G+ INTERFACE $59.00

For Commodore 64 and Vic 20 computers. Lets you use other printers with Centronics interfaces. This interface lets the printer act like a Commodore printer including printing the Commodore graphics (Dot matrix with graphic capability printers).
List $109.00 **SALE $59.00.**

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Commodore 64

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NEW

$199 Disk Drive $199

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• Commodore 64 • PET • 8032 • B128

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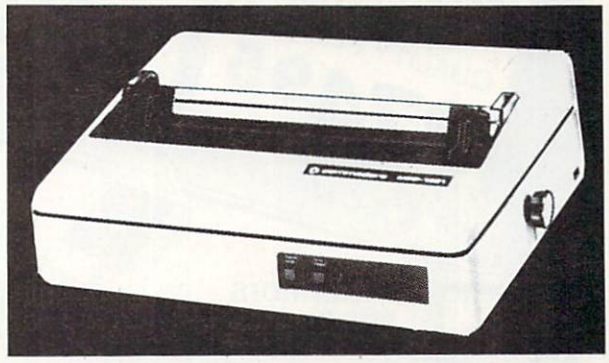
List $899.00. **Sale $199.00.** ***LIMITED QUANTITIES!*** *Requires 2 drive software.

$299.00 Sale $299.00

15½" High Speed 150-170 CPS

BUSINESS PRINTER



The MPP-1361 is a highly advanced 136-250 column 15½" professional tractor/friction printer with full Bit image graphics and downloadable characters for custom reports and program listings. The paper feed includes a multiple pin tractor for smooth error free operation. With the ribbon rated at 1 million characters (no mess cartridge) and the print head at 100 million characters this printer will last a lifetime. Full formatting with near letter quality makes lining up decimal points, automatic "$" signs and tabbing look fantastic and easy to use. With out a doubt **THIS IS THE BEST PRINTER VALUE IN THE U.S.A.** List $899.00 **Sale $299.00**. ***LIMITED QUANTITIES!***

SPECIFICATIONS

PRINTING METHOD
Serial Impact Dot Matrix

PRINT RATE
150-170 Characters per second (CPS)

PRINT STYLE
Near Letter Quality

PRINT DIRECTION
Bi-directional

COLUMN CAPACITY
136 - 250

LINE SPACING
Programmable

COPIES
3, including original

RIBBON TYPE
Cartridge ($14.95)

RIBBON LIFE
1 Million Characters

PAPER WIDTH
3" to 15½" tractor or single sheet friction

INTERFACE
IEEE Protocol

CHARACTER SIZE
0.116" high, 0.08" wide

GRAPHICS
Bit Image
Programmable Characters
Reverse Characters

ERROR HANDLING
Internal
Self - Diagnostics
Microprocessor

Commodore 64 IEEE Interface

This interface plugs into your Commodore 64 Disk Drive port and allows you to hook up the 1 Megabyte Disk Drive and MPP-1361 Printer as well as other IEEE devices. Separte power supply insures reliability. Fantastic Interface. (includes all cables) List $109.95. **If bought with printer or disk drive $69.00.**

(no interface needed for PET, B-128, and 8032 computers)

Add $17.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $35.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
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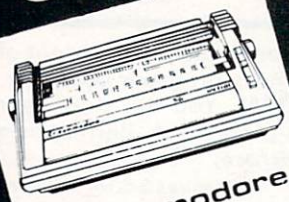
UNBELIEVABLE PRICES! (BELOW WHOLESALE)



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1101 LETTER QUALITY PRINTER
274.95

commodore
VIC 1541 DISC DRIVE
169.95

commodore
64
144.95

FREE Dustcover for Commodore 64 with any Hardware Purchase

commodore
1702 MONITOR
174.95

CARDCO PRODUCTS IN STOCK & ON SALE

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BMC Color 149.95
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Modems

Mighty Mo 64.95
Comm 1660 .... 79.95
Telesonic ..... Call

Cassette Recorders

Comm CN-2 ... 59.95
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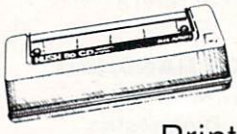

Printers

Gemini SG10 ..... 209.95
Gemini SD 10/15 NEW! .. Call
Gemini SR 10/15 NEW! .. Call
Gemini SB 10 NEW! .... Call
Gemini SG 15 ..... 359.95
Silver Reed 400 .... 249.95
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Smaller, Quieter
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Interfaces

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•Prints Enhanced Graphics, 4 Different Type Faces, & Reverse Characters •Includes Power Cord, Five Feet of Cable and All Required Connectors **59.95**
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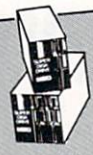
Microworld ..... Call

Diskettes

Nashua 10.95
Scotch 14.95
Maxell 14.95
Memorex 11.95*

*After $3 Mfr's Rebate. Expires 7/31/85

Indus GT Disc Drive
249.95



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MSD Super Disc II
Now On Sale
449.95
Single Drive 229.95

commodore **New Products**

801 MCS Color Printer 269.95

C-16 Computer ... 79.95
C+4 Computer .. 189.95
801 Printer 149.95
802 Printer 179.95
803 Printer 174.95

SOFTWARE SPECIALS

Fisher-Price

Learning Software

Alpha Build	12.99
Logic Levels	12.99
Movie Creator	12.99
Sea Speller	12.99
Songmaker	12.99
Up & Add 'Em	14.99

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Below The Root	16.99
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penguin software™

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Professional Software

Fleet System 2 — Word Processor with built-in 70,000 word spell check	59.95

CBS Software

Dr. Seuss Fix up The Mix-up Puzzler	19.99
Sesame Street Letter-Go-Round	19.99
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Pitstop	24.99
Pitstop II	24.99
9 to 5 Typing	24.99
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Touch Tablets

Koala Touch Tablet-D	69.95
Koala Touch Tablet-Cart	64.95
Muppet Learning Keys	Call

Access

Neutral Zone-D/T	20.95
Spritemaster-D/T	20.95
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Commodore

Program Ref. Guide	19.95
Assembler-D	17.95
Easy Finance I, II, III, IV-D	19.95
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Easy Script-D	39.95
Easy Spell-D	19.95
Logo-D	49.95
The Manager-D	37.95
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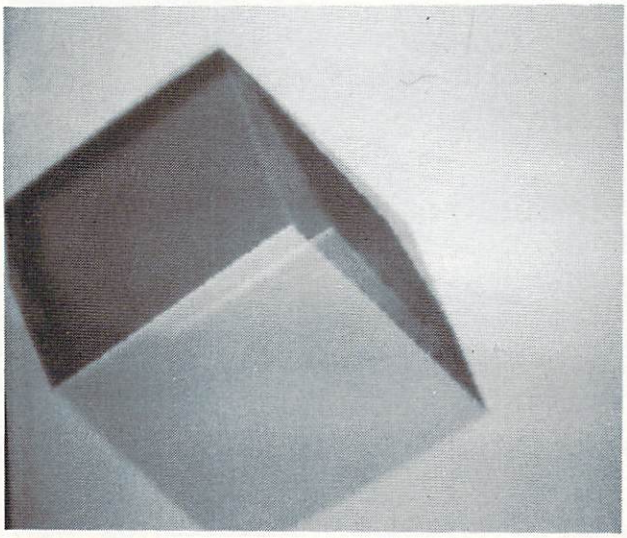
NEWS & VIEWS

SPECIAL C.E.S. EDITION

REPORTED BY:
Benn Dunnington



AMIGA display ??

DATELINE CHICAGO, SUMMER C.E.S., JUNE 2-5

Well, they broke my heart again: **Commodore** (as was rumored in advance) was not showing the **AMIGA** to anybody (except behind reporter-proof doors to selected big-time retailers). I wouldn't come back **completely** empty-handed tho, would I?

The picture above is allegedly generated by the fabled **AMIGA.**

I know the it doesn't look like much, but it may be the first ever published photo of an **AMIGA** display! We can't prove it because the suspected **AMIGA** was in a **locked box!** Why **Commodore** is so very very secretive about this machine is a mystery to me, but the waiting is about over: **Commodore** will be officially unveiling the **AMIGA** in New York in late July. **Ya Mo Be There!** (we'll have coverage of the big event in the very next issue, along with our jumbo **Product Roundup,** don't miss it!!)

Oh, what is the picture of? It's a spinning 3-D colored cube that approaches, receeds, and bounces around in response to **Soniture**'s sonic **Space Pen.** The speed and fluidity of the animation of even this simple demo was quite impressive.

I have a prediction to make: the commercial software package that will be most used to display the **AMIGA**'s power (and which will probably sell a MESS of **AMIGA**s for **Commodore**) will be **Sublogic**'s new flight masterpiece: **JET.** You just won't believe your eyes when you see these two together! (I'm sorry I don't have a picture of **JET** for you here, but the display on the IBM PC wouldn't do it justice.)

Commodore's Booth

INFO's Booth

NEWS & VIEWS

SPECIAL CES EDITION

ATARI's economy exhibit was right across from INFO's, so we got to see a lot of Software chief Sig Hartman (above), and the man himself, Jack Tramiel (below, right). If Jack was worried, he wasn't showing it to me!

The Commodore 900 Business Computer

ATARI was also at the show. After cancelling their spot several weeks before, **ATARI** made a brilliant face-saving, money-saving move, and booked in again at the last minute (it is speculated that they got a huge discount on the space, and because it was in a room, instead of on the floor, **ATARI** was out from the costly obligation to keep up with the JONESES (or more to the point, SMITHS) by erecting the usual type of display that can often hit close to 1 million bucks for a major exhibitor.) This type of maneuvering suggests two things to me: 1) that Jack Tramiel and his merry band are "buns to the wall" with a company that may have little more than cab-fare for the chief in its coffers, 2) that Jack Tramiel and his merry band are crafty survivors who can't be counted out until the last byte is bit, and that if anyone can pull **ATARI** out of an impossible situation, this guy can. Note, **ATARI** was saying at the show (June 5) that the new ST's would be shipping within 2 weeks. The chips are on the table, and the discards are down.....

Commodore, on the other hand, was saying that the **C-128** was already in transit to major retail chains. Look for it.

Commodore had a few (not many) surprises of its own: the **C-900** (UNIX compatible, 10 Mhz Z8000, multi-user/ multi-tasking, 1024 X 800 resolution bit-map display, with a 20 Meg hard drive standard) is available in Europe only for the time being, with a rumored 4th quarter US introduction (expected price: $2700!)

ERG-CARD™ REFERENCE CARDS

WELL, BY NOW YOU ALL HAVE YOUR ERGBOARDS, RIGHT? (NO? SEE INSIDE BACK COVER FOR DETAILS ON THE AMAZING ERGBOARD... BE THE FIRST IN YOUR USER GROUP TO OWN ONE... ORDER YOURS TODAY!) ACTUALLY YOU CAN USE THESE REFERENCE CARDS WITHOUT THE ERGBOARD (IT'S JUST NOT AS HANDY- TAPING THEM TO YOUR MONITOR). INSTRUCTIONS: CAREFULLY REMOVE CENTERFOLD FROM STAPLES, CUT ALONG COLORED BORDERS, POSITION IN ERGBOARD REFERENCE WINDOW, USING THE ORIGINAL CARDS FOR SUPPORT (OR TAPE 'EM TO YOUR MONITOR). USE THE BLANK BACKSIDES FOR MAKING YOUR OWN REFERENCE CARDS. KEEP SENDING YOUR SUGGESTIONS FOR ERG-CARDS YOU'D LIKE TO SEE. -THE EDITOR.

ERG-CARD™ FOR USE WITH CP/M™ Plus

CP/M is a trademark of Digital Research Inc.

A> (THE CP/M PLUS PROMPT)
|||Prompt Character
||Logged Drive (A-P)
User Number (1-15)
(Default User 0 not displayed)

40 COLUMN MODE
CTRL/[crsr key] scrolls virtual 80 column screen left and right

VIRTUAL DRIVE E
Drive E is an imaginary drive implemented on drive A to allow two-drive functions. When drive E is accessed, you will swap disks in drive A.

LINE EDITING CTRL COMMANDS

CTRL H	Cursor left
CTRL B	Beginning of line
CTRL C	Reboot CP/M
CTRL E	Continue on next line
CTRL F	Cursor right
CTRL G	Delete char. under crsr
CTRL A	Delete char. left of crsr
CTRL I	Tab to next stop
CTRL J	Return
CTRL K	Delete to end of line
CTRL M	Carriage return
CTRL P	Toggle printer on/off
CTRL Q	Resume output
CTRL R	Repeat line
CTRL S	Pause output
CTRL U	Cancel command
CTRL W	Recall command
CTRL X	Delete all left of crsr

RESIDENT COMMANDS

```
COMMAND d:filename.typ [OPTIONS]
                 |   |      |
                 |   |      file type (3 char. max)
                 |   file name (8 char. max)
                 drive specifier (A to P)

[OPTIONS] may be omitted

PASSWORDS (optional):
d:filename.typ;password
  If a password is used in the creation of
  a file, it must be used to access the file.

WILDCARDS:
  ?   Substitutes for character
  *   Substitutes for remainder
      of file name or file type
```

RESIDENT COMMANDS

```
COPYSYS
 Copies system tracks to new disk
DATE C   Display date and time
DATE SET set date and time
DEVICE [OPTIONS]
 Display or set devices
DUMP d:filename.typ
 Displays file in hex and ASCII
ED d:filename.typ
 Edit named file.
GET FILE filename.typ [OPTIONS]
 Redirects input from file
HELP topic ,subtopic [OPTIONS]
 Display Help
INITDIR d:
 Initiates time and date stamping
LIB d:filename.typ
 Manipulate library file
LINK d:filename.typ [OPTIONS]
 Makes MAC file executable
```

TRANSIENT COMMANDS

```
MAC filename [OPTIONS]
 Assemble named source file
PATCH
 Customize CP/M PLUS system
PIP d:newfile.typ=d:oldfile.typ
 Copies named file
PIP E:newfile.typ=A:oldfile.typ
 Single drive file copier
PUT NORMAL NEW [OPTIONS]
 Redirect output from normal
 device to new device
SET [OPTIONS]
 Set file and disk options
SETDEF [OPTIONS]
 Sets system defaults
SHOW [OPTIONS]
 Displays disk information
SID d:filename.typ
 Symbolic Instruction Debugger
SUBMIT d:filename
 Executes batch filename.SUB
```

FILENAME EXTENSIONS

ASC	ASCII File
ASM	Assembler Source
BAK	Backup
BAS	BASIC Source
C	C Source
COB	COBOL Source
COM	Executable Program
DAT	Data
DOC	Document text
FOR	FORTRAN Source
HEX	Intel Hex Object
HLP	Help
LIB	Language Library
OBJ	Machine Code Object
OVR	Overlay
PAS	Pascal Source
PRN	Assembly Print Listing
REL	Relocatable M/L Object
SUB	SUBMIT file
SYM	Assembler symbol file
SYS	System file
TEX	Document Text
$$$	Unusable Temporary File

ERG-CARD™ FOR USE WITH BASIC 7.0

a colored keywords are new to 7.0

COMMANDS AND STATEMENTS

```
APPEND #logical file number,"filename"
       [,Ddrive#][<ON,>Udevice]
AUTO [line#]
BACKUP source Ddrive TO dest. Ddrive
       [<ON,>Udevice]
BANK bank number
BEGIN/BEND  IF condition THEN BEGIN
              statement
              statement BEND:ELSE BEGIN
              statement
              statement BEND
BLOAD "filename"[,Ddrive][,Udev]
      [,Bbank#][,Pstart address]
BOOT "filename"[,Ddrive#][<ON,>Udev#]
BOX [color source],X1,Y1[,X2,Y2]
    [,angle][,paint]
BSAVE "filename"[,Ddrive][,Udev][,Bbank],
      Pstart address TO Pend address
CATALOG [Ddrive][<ON,>Udevice][,wild]
CHAR [color source],x,y[,string][,RVS]
CIRCLE [color source],X,Y[,Xr][,Yr]
       [,sa][,ea][,angle][,inc]
CLOSE file number
CLR
CMD logical file number [,write list]
COLLECT [Ddrive][<ON,>Udevice]
COLLISION type [,statement]
COLOR source number, color number
CONCAT "file 2"[,Ddrive] TO "file 1"
       [,Ddrive][<ON,>Udevice]
CONT
COPY "source filename"[,Ddrive] TO
     "dest filename"[,Ddrive][<ON,>Udev]
DATA list of constants
DCLEAR [Ddrive][<ON,>Udevice]
DCLOSE [logical file #][<ON,>Udevice]
DEF FN name (variable) = expression
DELETE [first line] [-last line]
DIM variable (subscripts)[,var (subs)]...
DIRECTORY [Ddrive][<ON,>Udevice][,wild]
DLOAD "filename"[,Ddrive][,Udev]
DO/LOOP/WHILE/UNTIL/EXIT
   DO [UNTIL cond./WHILE cond.] statements
   [EXIT] LOOP [UNTIL cond./WHILE cond.]
DOPEN logical file #,"filename[,<S/P>]"
      [,Lrecord length][,Ddrive]
      [<ON,>Udevice][,w]
DRAW [color source],X1,Y1 [TO X2, Y2]...
DSAVE "filename"[,Ddrive][<ON,>Udevice]
DVERIFY "filename"[,Ddrive][<ON,>Udev]
END
ENVELOPE env#[,attack][,decay][,sustain]
         [,release][,wave][,pulse wdth]
FAST
FETCH #bytes,intsa,expb,expsa
FILTER [freq][,lp][,bp][,hp][,res]
FOR/TO/STEP/NEXT
     FOR variable=start value TO end value
     [STEP increment]
GET variable list
GETKEY variable list
GET# file number, variable list
GO64
GOSUB line number
GOTO/GO TO line number
GRAPHIC mode [,clear][,s]
GRAPHIC CLR
HEADER "diskname"[,Ddrive][<ON,>Udevice]
HELP
IF/THEN /ELSE
    IF expression THEN statements
    [:ELSE else-clause]
INPUT ["prompt string";] variable list
INPUT# file number, variable list
KEY [key number, string]
LET
LIST [first line][-last line]
LOAD "filename"[,dev #][,relocate flag]
LOCATE x,y
MONITOR
MOVSPR number,x,y
MOVSPR number,+/-x,+/-y
MOVSPR number,x;y
MOVSPR number,x angle #y speed
NEW
ON expr.<GOTO/GOSUB>line#1[,line#2,...]
OPEN lfn,device[,secondary add]
     [,"filename,filetype,mode"]/[cmd$]
PAINT [color source],x,y[,mode]
PLAY "Vn,On,Tn,Un,Xn,elements"
POKE address, value
PRINT [print list]
PRINT# file number, print list
PRINT USING
    PRINT[file#] USING"format": print list
PUDEF "nnnn"
READ variable list
RECORD# lfn,record number[,byte number]
REM message
RENAME "old filename"TO"new filename"
       [,Ddrive][,Udev]
RENUMBER [new starting line number]
         [,increment]
         [,old starting line number]
RESTORE [line #]
RESUME [line # / NEXT]
RETURN
RUN [line #]
RUN "filename"[,Ddrive][,Udev]
SAVE ["filename"][,dev][,EOT flag]
SCALE n[,xmax,ymax]
SCNCLR mode number
SCRATCH "filename"[,Ddrive][,Udev]
SLEEP n
SLOW
SOUND v,f,d[,dir][,m][,s][,w][,p]
SPRCOLOR [mcr-1][,mcr-2]
```

ERG-CARD™ FOR USE WITH BASIC 7.0

b colored keywords are new to 7.0

COMMANDS AND STATEMENTS

SPRDEF *built-in sprite editor:*

key	*result*
1-8	Selects sprite #
A	Toggle automatic crsr.
CRSR KEYS	Move cursor
RETURN	Start on next line
RETURN	Exit editor at the SPRITE NUMBER? prompt
HOME	Crsr to top left
CLR	Erases entire grid
1-4	Selects color source
CTRL 1-8	Sprite frgrnd color 1-8
C= 1-8	Sprite frgrnd color 9-16
STOP	Cancels changes
SHIFT RTRN	Saves sprite

```
SPRITE <#>[,on/off][,fgnd][,priority]
       [,x-exp][,y-exp][,mode]
  parameter     description
  NUMBER.....sprite number 11-8
  ON/OFF.....sprite on (1) off (0)
  FOREGROUND....foreground color (1-16)
  PRIORITY.....0=in front / 1=behind
  X-EXP.....1=on / 0=off
  Y-EXP.....1=on / 0=off
  MODE.....0=normal / 1=multicolor
SPRSAV <origin>,<destination>
SSHAPE string variable,X1,Y1[,X2,Y2]
GSHAPE string variable [X,Y][,mode]
STASH #bytes,intsa,expb,expsa
STOP
SWAP #bytes,intsa,expb,expsa
SYS address[,a][,x][,y][,s]
TEMPO n
TRAP [line#]
TROFF
TRON
VERIFY "filename"[,dev#][,relocate flag]
VOL volume level
WAIT <Location>,<mask-1>[,mask-2]
WIDTH n
       width 1=single width lines
       width 2=double width lines
WINDOW xmin,ymin,xmax,ymax[,clear]
```

FUNCTIONS

```
ABS (X)
ASC (X$)
ATN (X)
BUMP (N)
CHR$ (X)
COS (X)
DEC (hexidecimal string)
ERR$ (N)
EXP (X)
FNxx (x)
FRE (X)
HEX$ (X)
INSTR (string 1, string 2 [,start pos.])
INT (X)
JOY (N)
LEFT$ (string,integer)
LEN (string)
LOG (X)
MID$ (string,start position [,length])
PEEK (X)
PEN (n)
POINTER (variable name)
POS (X)
POT (n)
RCLR (N)
RDOT (N)
RGR (X)
RIGHT$ (<string>,<numeric>)
RND (X)
RSPCOLOR (register)
RSPPOS (sprinte number,position/speed)
RSPRITE (sprite number, characteristic)
RWINDOW (n)
SGN(X)
SIN(X)
SPC(X)
SQR(X)
STR$ (X)
TAB(X)
TAN(X)
USR(X)
VAL(X$)
XOR(n1,n2)
```

ESCAPE CODES

@	Erase from crsr. to end of window
A	Automatic insert mode
B	Set bottom right corner of window
C	Cancel insert and quote modes
D	Delete current line
E	Set cursor to non-flashing mode
F	Set cursor to flashing mode
G	Enable bell (by Ctrl-G)
H	Disable bell
I	Insert a line
J	Move to beginning of current line
K	Move to end of current line
L	Turn on scrolling
M	Turn off scrolling
N	Return to norm. display (80 col. only)
O	Cancel automatic insert mode
P	Erase from beginning of line to crsr.
Q	Erase from crsr. to end of line
R	Reverse video screen (80 col. only)
S	Change to block cursor
T	Set top left corner of window
U	Change to underline cursor
V	Scroll screen up one line
W	Scroll screen down one line
X	Toggle between 40 and 80 columns
Y	Restore default TAB stops
Z	Clear all TAB stops

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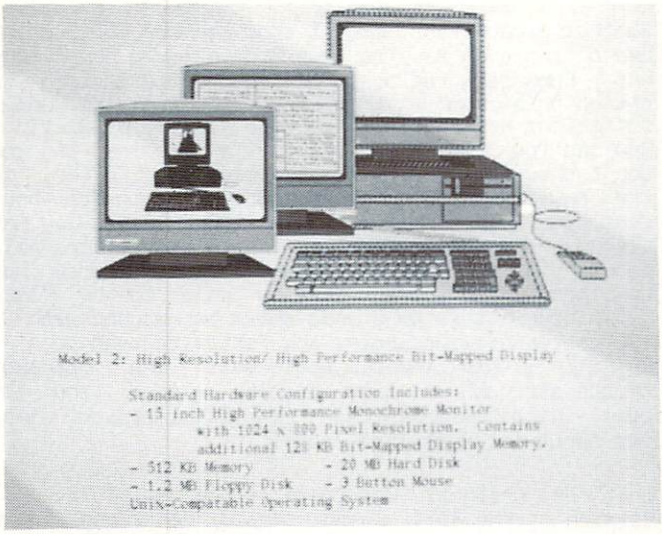


64	64	64
64	64	64
64	64	64
64	64	64

C-900 can display the equivalent of 12 C-64 screens at one time!

1/2 megabyte ramdisk (big white box in expansion port) will enable sensational real-time animation as well as put a fire under your DBMS !!!

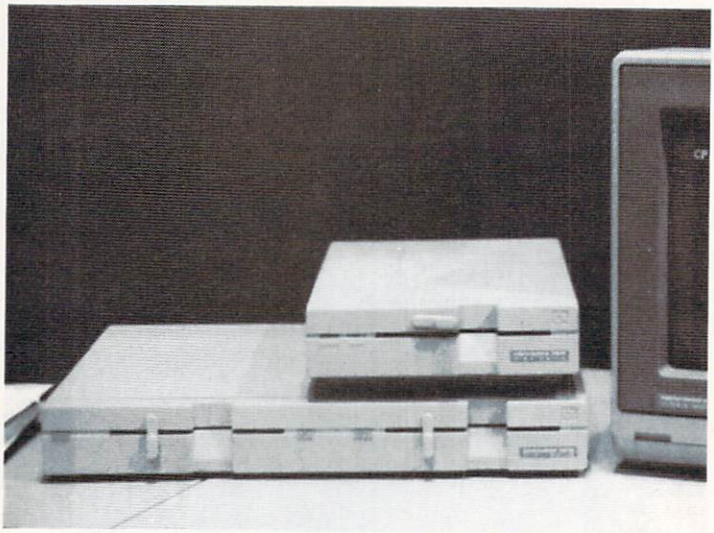
Trio of IBM PC clones are nice to look at, but you won't be buying one stateside for awhile.

Commodore also showed their IBM PC clones (see photo), but stated that they were back-ordered in Europe for months, with 8 times the anticipated demand, and would not even consider US production in the near future.

One thing you **will** be able to acquire before too long and which will help blow things open for the **C-128** is the 1/2 Meg **Commodore** ramdisk (see photo). This little puppy is capable of loading in graphics screens so fast, that you must actually slow down the normal transfer rate to keep the animation viewable! We heard some ball-park guesses as to the price: about $200-$250, with availability as soon as early fall.

NEWS & VIEWS

SPECIAL CES EDITION



1572- a nice set of drives for the serious user.

Another product that **didn't** show was the **LCD,** which has gotten such rave reviews from all who have seen her. **Commodore** top brass has apparently decided to sit on this number (not even showing it) until sufficient orders are in hand to justify production. How can you drum up orders for a machine if you don't show it? The real news about the LCD tho, is the new display which **Commodore** engineers have developed in-house: the original 80 X 16 display was already considered the fastest, most readable display in the industry, and now **Commodore** has developed a replacement that is said to be "like jet-black letters on a snow-white background with a 120 degree viewing angle, and faster refresh than a CRT"!!! I think the LCD would sell like hot-cakes on the strength of this display alone! (and the built-in software has been greatly improved since its debut in Vegas last Jan.).

What else was hot? OK, there is the new **1572** dual version of the **1571** which should be along in a while. Looks sexy, right?

Speaking of "sexy", get a load of the picture (to the left) of the **C-128 D!** The "D" is supposedly for "Dealer" since the **C-128 D** is **Commodore**'s solution to the problem of how to keep the dealers happy while mass-merchandising the regular **C-128** thru K-Mart, Sears, etc. So, the dealers get this, albeit wonderful, version of the **C-128** with detachable, stowable keyboard, built-in drive and powersupply, whose system housing doubles as a monitor stand; you bet I want one, but the rumored price ($700) may slow sales, depending on the system price at K-Mart for the equivalent component set-up.

One last item, not directly related to **Commodore** (but cute): below is a **wrist terminal** of sorts, made by **SEIKO** which interfaces with your **C-64,** and stores a couple hundred phone numbers, appointments, etc. and can beep to let you know when to do what!

Well, bye for now... next stop- **AMIGA**land.

C-128D: Dealers will get this nifty version of the C-128 later this year. Transportable and respectable looking.

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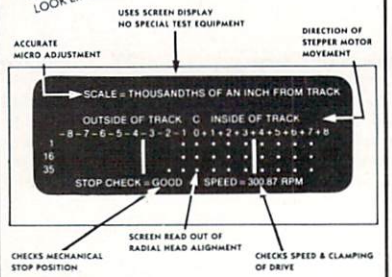

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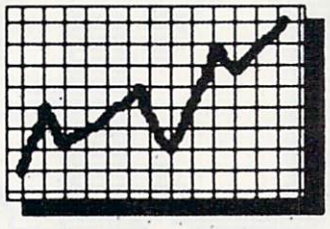

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A TUTORIAL BY: MARK R. BROWN

First of all, let's review what **CP/M** is: it's an operating system. I doesn't do anything for you except manage the computer. **CP/M** sits there and waits for you to ask it to run a program, list a directory, or edit a file, just like **BASIC** does. It just does it better. It only works with an **8080** or **Z80** cpu chip, so the **C128** has one that switches in just for **CP/M** mode. **CP/M** works with either the forty column or the eighty column **VIC** chip, and can run the **SID** chip, too. Since the **Z80** clock runs at **4MHz**, **CP/M** should run rings around the **C128**'s other two operating modes. The new **1571** drive even runs faster under **CP/M** and stores more data. My guess is that **CP/M** will be the mode of choice on the **C128** for serious software developers.

BOOTING UP CP/M PLUS

So how do you turn on all this power? **CP/M** does not reside in memory, but is loaded in from disk. Insert the **CP/M** disk in the **1571** drive and turn on the computer. The **C128**'s power-on ROM routine checks to see if there's a Commodore 64 cartridge plugged in (you did unplug TANK ATTACK first, didn't you?) and then checks the drive to see if the **CP/M** disk is in it. If it is, it boots up **CP/M** and quits. Otherwise, it will go on to resident **C128 BASIC** 7.0 mode. If you forgot to put **CP/M** in the drive first and ended up in **C128** mode, don't start all over. Stick the **CP/M** disk in the drive and type **BOOT** in direct mode. It does the same thing as the power-up routine. You fire up with forty columns; if you want eighty, use the **ASSIGN** statement to switch over, as explained in the **C128** manual.

The **CP/M** version you get with the **C128** is called **CP/M PLUS** by **Digital Research,** though Commodore is fond of calling it **CP/M 3.0.** It is a very powerful, very confusing system. You are faced with a plethora of commands and a multitude of options to go with them. Fortunately, you can get by with just a few commands at first and add what you need as you go. Refer often to Commodore's manual and the **Erg-Card** in this issue. If you want a good third-party handbook to help you along, there aren't many to choose from; most only cover **CP/M** up to **Version 2.2.** The third edition of **The Osborne/McGraw Hill CP/M User Guide by Thom Hogan** is recent enough to cover **CP/M PLUS** very well, however. I recommend it highly.

THE PROMPT

The first thing you will notice on the **C128**'s screen is the **CP/M PLUS** prompt. It looks like this: **A>** . This tells you that you are logged into drive "A". **CP/M PLUS** allows you to have up to sixteen disk drives (including hard disks), designated by the letters "A" to "P". (Since I don't have a **C128** in hand yet, and this is all based on preliminary information, I can't be sure, but the Commodore 64 **CP/M** system includes the ability to configure a single drive as two drives by allowing you to swap disks. The **C128** should allow the same thing. Look for a **CONFIGURE** program in the manual and on the disk.) To log to another drive if you have one, just type its designated letter followed by a colon: **B:** . All of the commands you give **CP/M** will use the currently logged drive unless you designate another drive specifically. The prompt is also telling you something else, though it's telling you by not showing it. The **CP/M PLUS** system allows you to designate up to sixteen seperate users for the system. All of the commands you give to **CP/M** will work only on files designated to your current user number (1 to 15). You change users by typing: **USER n** . The user zero area is common to all users of the system, and so is not shown by the **CP/M** prompt. For any other user, it is displayed preceding the prompt like this: **3A>** . This way you don't mess up somebody else's data on the same disk. This is especially useful for hard disk systems, where the disk directories can become huge and unweildy, and where the potential for disasterous mistakes is much greater.

LINE EDITING COMMANDS

When you start typing stuff in from the keyboard, you will discover that besides the normal cursor and editing keys, **CP/M** allows many extra line-editing functions. These are accessed by using control key combinations. The full set of **CP/M PLUS CTRL**/key combinations is listed on the **Erg-Card** in this issue, but the most useful are probably:

CTRL/B	Go to beginning of line
CTRL/C	Reboot CP/M
CTRL/K	Delete to end of line
CTRL/P	Toggle printer on/off
CTRL/S	Pause output
CTRL/Q	Unpause output

The others either repeat functions already provided by the keyboard's editing keys, or are seldom needed.

CP/M 3.0 continued...

RESIDENT COMMANDS

CP/M has two types of commands, **RESIDENT** and **TRANSIENT.** Resident commands are in memory at all times; transient commands are actually programs that load and run only when you need them. You can add your own transient commands to **CP/M;** whenever you type something that **CP/M** doesn't understand, it first checks to see if it's the name of a program on disk. This is the way you load and run programs in **CP/M:** just type the name of the program you want, and **CP/M** does the rest. Of course, if it's not on the disk, you'll hear about it! If you mistype a normal command, such as typing DOR instead of **DIR, CP/M** will first look for DOR on disk before it gives you an error message. Be careful typing; it will save you a lot of time waiting for disk accesses.

There are really only about five resident **CP/M** commands. **USER** you have already met. The other four have to do with disk file manipulation. These commands use the format: **COMMAND d:filename.typ** . The **d:** is an optional drive designation. If it's left off, the command will assume the currently logged drive. The filename can consist of up to eight alphanumeric characters. The type (typ) consists of up to three alphabetic characters following a period. This is used by the user and sometimes by the system to differentiate types of files. For example, a file called POGO.BAS is a **BASIC** source file named POGO. There are many more or less standard **CP/M** file extensions around. The only critical ones are those that transient programs expect to be there, like the **.ASM** expected by the **MAC** assembler. These are few and far between. You'll find out about them as you need to. Filenames and types can be partially designated in most commands by using the same wildcards you are used to in **BASIC,** the **?** and the *****. The only difference is that they are used for both the filename and the type. For example, DIR *.BAS will find all the **BASIC** source files on a disk, and DIR KUMQUAT.* will find all the files named KUMQUAT of any type. Likewise, DIR ?????.* will find all the files with five letter names of any type, and DIR CA?.BAS will display CAT.BAS, CAD.BAS, CAM.BAS, etc.

We seem to have introduced the directory command there, too. **DIR** displays all the files on the current drive for the current user if typed by itself. Wildcards give you more flexibility, and you can use the option of designating which drive you want a directory of. There are many additional options that can be used with DIR, most having to do with how much information you get about your files and how that information is formatted for output. You don't really need all the bells and whistles for now, though.

ERASE and **RENAME** do exactly what they say they do. ERASE d:filename.typ is the format for that command, and if you use wildcards you will be prompted to confirm that you want those files erased. RENAME d:newname.typ=oldname.typ is nearly identical to the **1541 DOS** command it resembles. Notice that if you designate a drive, you don't do it twice (once for each filename) since you are renaming a file on one drive only.

TYPE d:filename.typ is used to display an **ASCII** file on the current output device (usually the screen or printer). Make sure you only use **TYPE** with valid **ASCII** files and not with program files. At best, **TYPE**ing a program file will give you a garbled screen. **At worst, it could crash your system.** Be careful.

TRANSIENT COMMANDS

There are a whole handful of transient **CP/M** commands. Here are the most useful:

COPYSYS. You will use this to copy the **CP/M** system to new disks. Just type **COPYSYS** and follow the prompts.
DATE C. Displays the time and date continuously. **DATE SET** lets you set it in the first place. You will be prompted for input.
ED d:filename.typ. ED is the standard **CP/M** text editor for creating text and program source files. It is an antique dating back to the teletype terminal days and nobody ever really uses it unless they are terribly desperate. I suggest you find a copy of **VDO** (in the public domain, available from **Cardinal Software** for $10.00), or the **ACE Text Editor** from **Adequate Software** ($35.00) which has many of **Wordstar**'s commands, or something similar. You will be much happier with **CP/M** if you do.
HELP. This is a great addition to **CP/M PLUS** that none of the previous versions had. Keep your **CP/M** disk in the drive as much as you can, and when you get stuck, type **HELP.** You can add topic and subtopic requests to your help request as you become more used to the system. If in doubt, shout HELP!
PIP d:newfile.typ=d:oldfile.typ. Copies a file from disk to disk. You must designate both drives or you'll get a copy on the same disk you started with. PIP has many options, and has likewise been superseded by newer **COPY** programs. There is probably one on the **C128 CP/M** disk. If so, use it instead.
SHOW. Displays information about your disk and drive. **SHOW** has many options. Study up on this one in the manual before you use it so you know what all that information means.
There are others, but these should get you going. When a transient command (or any program, for that matter) is done, it will expect the system disk containing **CP/M** to be mounted in the drive so it can reboot the **CP/M** operating system. A **CTRL/C** from the keyboard does the same thing. Make sure the disk is there for it to find.

NOW WHERE TO?

There are thousands of public domain programs out there. The **1571** drive will read standard **IBM 34** format disks, which include **Osborne** and **Kaypro** and others. It will also read Commodore 64 **CP/M** format. Most of the generic public domain stuff should run on the **C128** under **CP/M** PLUS. Check out the bulletin boards listed in the last issue, or the public domain sources listed in this one. Read your manuals and study your **Erg-Cards.** Experiment. Go to college. Win the Nobel Prize. You will have to put as much effort into it as you need, to get as much out of it as you want, but for most of us that won't be an overwhelming amount. You will find that you'll learn most of it as you go. **Good luck.**

the best of: CP/M 3.0

* WHAT'S AVAILABLE
* WHO MAKES IT
* WHERE TO GET IT
* WHY YOU WANT IT
* WHAT IT DOES
* WHAT IT COSTS

BY MARK BROWN

Commodore's **C128** computer has three cpu chips: the new **8502**, the **6510** for the **C64** mode, and a **4MHz Z80A** for the **CP/M** mode. (See Benn's CES report in the last issue for details.) The **C128**'s **CP/M** mode would have made an impressive machine on its own. It's got 128K of RAM, twice as much as most **CP/M** machines, 16 colors where most are monochrome, 40/80 columns switchable, and superfast disk access with the new **C1571** drive. But what about software? What can you run on the **C128** under **CP/M**?

The answer for right now is that nobody knows for sure, but the outlook is encouraging. Any **CP/M** program written to be transportable should run without modification on the **C128.** Two of the best **CP/M** programs, **Wordstar** and **dBase II** (see sidebar), have been tested by **Commodore** and run fine. The transportability and compatability of other packages depends on several factors.

The first problem that can arise is disk format incompatibility. This was the biggest single factor in the death of the **CP/M** cartridge for the **Commodore 64.** It could not read any **CP/M** disks but those in its own (very peculiar) format. Someone had to take existing **CP/M** disks and port them over to the **C64,** a task that took time and special equipment. This problem has been properly addressed in the **C128.** It can read **IBM System 34** 5.25" disks, which is more or less an industry standard; included are **Osborne** and **Kaypro** disks and others. It will even read the strange **Commodore 64 CP/M** disk format, so if you are building a **Commodore 64 CP/M** library it will not be made obsolete by the **C128.**

Another problem comes from the difference between standard **CP/M** and machine-specific **CP/M** programs. This is akin to the trouble encountered when moving Microsoft **BASIC** programs from machine to machine. As long as the programmer uses standard **BASIC** commands, the program transfers fine. But when he uses peeks and pokes, or machine-dependent features, the program won't run. Likewise, **CP/M** programs that are written using standard **BDOS** and **BIOS** calls will run fine on the **C128.** Any that use machine-specific functions won't. This problem is not as bad for **CP/M** as it is for **BASIC,** though. Because of the abundance of different **CP/M** computers, it became prudent for **CP/M** programmers to allow for maximum transportability early on. Many **CP/M** programs even feature a configuration menu that allows you to set up the program for your specific hardware. Programs with this degree of flexibility will probably run without a hitch on the **C128.**

Something else to watch out for is confusion over what **CP/M** is. It is not a language, but an operating system, and it has gone through several incarnations. The **C128** runs the most recent **CP/M** revision, **CP/M-PLUS** (also called **CP/M 3.0**), which is upwards compatible with **CP/M 1.4** and **CP/M 2.2** (sometimes collectively called **CP/M-80**). **C128 CP/M** is not very compatible with **CP/M-86, MP/M,** or **CP/M-68K,** which are versions for 16-bit cpu chips or multi-user systems. A program should say it was written for **CP/M-PLUS, CP/M 2.2, CP/M 1.4,** or **CP/M-80** for it to have a chance to run on the **C128. CP/M** was originally written for the **8080** cpu chip, which was the direct ancestor of the **Z80A** in the **C128.** All **CP/M** programs that work on an **8080** will work on a **Z80,** but some specify a **Z80**-based **CP/M** system, which of course includes the **C128.**

Other restrictions you may run into relate to hardware requirements. Very few **CP/M** programs require more than **64K** of memory, but some may require more than 128K. Obviously, these few will not run on an unexpanded **C128.** Some **CP/M** programs still require 8" disk drives, too, and these will be incompatible. Still others need a hard disk to operate, or at least to operate effectively, and **C128** users will have to await the successful entrepreneur who first introduces a hard disk for this machine. (See Benn's note in issue #6.) The final hardware consideration concerns graphics capabilities. Since computers differ so much in how they handle graphics, most graphics-oriented programs will probably not run.

Remember that besides commercial software, there is a lot of public domain **CP/M** software out there. Much of it will run on the **C128.** This includes languages, word processors, database managers, terminal programs, utilities, etc. Almost every commercial application has a public domain counterpart, and many public versions are actually superior to their costly commercial cousins! Check out **CP/M** users' groups, both national and local, and **CP/M** bulletin board systems for help. We'll try to cover this exciting software source in a future article.

MS-DOS CHAUVINISM

You might not be able to run dBase II on your new Commodore 128 computer; Ashton-Tate has quit supplying dBase II in any 5.25" CP/M formats. They are following the industry and concentrating strictly on IBM-PC compatible software. Many other software companies are doing the same thing, in defiance of common sense and general economic sanity. The last industry poll I saw said that only 5% of all personal computers out there were IBMs. Even with all the compatibles, the installed base of MS-DOS and PC-DOS machines is still MUCH less than the number of CP/M computers in use. In spite of this, manufacturers are abandoning CP/M in droves to compete for the IBM market.

Sure, I realize that MS-DOS is the wave of the future. It has no real technical merits over any other operating system, but the IBM initials have seen to its enduring position in the microcomputer marketplace for the next few years, anyway. The point is that manufacturers and software houses seem too eager to abandon proven markets for the future wave. Before a machine or an operating system is dead, they kill it by abandoning it. Witness the VIC-20 and the TI99/4A; both have an installed user base of a million or more units, but who's supporting those users now? Just a couple of small, wise, profitable companies. CP/M seems to be headed in the same direction, despite the introduction of occasional solid (even spectacular!) new machines like the Commodore 128. The MS-DOS wave seems to be carrying all the new software introductions with it, and is washing away even old standards like dBase II. The momentum is building; I'm sure that it would take a lot to get Ashton-Tate to overcome their MS-DOS chauvinism and re-release a 5.25" version of dBase II for CP/M.

The smaller companies seem to still be friendly, even enthusiastic, towards the introduction of a new CP/M computer like the C128. They will, I'm sure, provide ample support for it. I hope that Ashton-Tate and the other large companies rethink their position on CP/M so that dBase II and comparable quality programs do not disappear from the marketplace prematurely. If nothing else, I hope that Commodore realizes the position this puts their new machine in. For their own good, they should put pressure on the software companies to keep their 5.25" CP/M offerings available. Better yet, Commodore could license these titles and offer them at vastly reduced and more realistic prices. You can help to influence their decisions; write to Commodore and voice your concern.

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CONTINUED...

There are many companies that are heavily involved in porting and translating their **CP/M** programs to new machines, so even if a program you want won't run on the **C128** right away, the number of **C128**'s on the market is sure to influence some of these manufacturers to move in fast. Be patient. In the meantime, we've made some educated guesses and compiled a list of **CP/M** programs that **PROBABLY WILL RUN** on the **C128.**

These were our criteria for selecting programs for this list:

(1) A history of transportability. If it runs on a lot of machines with little or no translation, it will probably run on the **C128,** or at least may be quickly and easily translated by the software publisher.
(2) Format compatibility. If it's available in the proper **CP/M** version in many disk formats, especially Kaypro or Osborne, it seems a likely candidate for the **C128.**
(3) Hardware requirements. It has to be able to run in 128K or less, and need no hard disk or 8" drive.
(4) Generality. We included no graphics or telecommunications programs because of the hardware-specific nature of these applications.
(5) Utility. We didn't list every program we thought might run. There are over **5000 CP/M** programs out there! This is meant to be a list representative of the best and most useful programs available that met with our other criteria.

The key to this list is the word **PROBABLY!** Without testing, there is no way to know which will work and which will not. Those which have been tested by **Commodore** and are known to work have been marked with an asterisk (*). **Happy Hunting!**

OUTSIDE SOURCES USED IN THE COMPILATION OF THIS LIST:

LIST MAGAZINE

BYTE MAGAZINE

COMPUTER LANGUAGE MAGAZINE

CREATIVE COMPUTING MAGAZINE

COMPUTER SHOPPER

"THE BEST OF CP/M SOFTWARE"
BY JOHN D. HALAMKA
SYBEX COMPUTER BOOKS

continued...

use the 3-letter code to find vendors in the index at the end of this article.

WORDPROCESSING

Colortext JIC 99.00
Color word processor.

The Final Word MOU 300.00
Dual-mode word processor with auto-save security and error undo.

FYI 3000 FYI 395.00
DBMS-type sorting and file management for wordprocessor files.

MagicIndex CET 295.00
Automatic index and table of contents generator.

MailMerge MPI 250.00
Adds form letter capability to Wordstar.

Palintir Speller PAL 145.00
Spelling checker for Palintir wordprocessor.

PALINTIR WORDPROCESSOR PAL 250.00
Wordprocessor featuring boilerplating, proportional spacing, horizontal scroll.

PERFECT WRITER* PER 349.00
Wordprocessor featuring split-screen editing, long files, simultaneous editing.

Proportional Spacing WRC 75.00
Gives proportional spacing to Wordstar files with daisywheel printer.

Propstar CCC 49.95
Stand-alone proportional printing program for Wordstar and daisy wheel printer.

Punctuation & Style OAS 125.00
Punctuation and style checker for wordprocessor files.

Sensible Speller SSI 125.00
Random House Dictionary spelling checker for Wordstar.

Spellbinder LEX 495.00
Integrated wordprocessor with mail list management, math functions.

Spellguard ISA 295.00
Wordstar spelling checker.

Spellstar MPI 250.00
Spelling checker for Wordstar.

Synonymn Finder WRC 149.95
A Thesaurus for Wordstar and Multimate

TransText IRR 99.00
Translates wordprocessor text formats.

WordPatch RMS 49.95
Wordstar improvement modification program.

Wordstar* MPI 495.00
The original CP/M word processor, against which all others are judged.

DATABASE MANAGEMENT

Cardbox CPC 245.00
Electronic filing system that emulates a card file.

Condor CON 650.00
Relational database creation program along the lines of dBase II.

Database 3 HOL 50.00
Inexpensive database and filing program.

dBase II* ASH 700.00
The quintessential programmable database system generator.

dBase II Templates IIS 39.95
Templates to use with dBase II for receivables, payables, inventory, etc.

dBase II Utilities HCS 30.00
Utilities to decode, modify, and speed up dBase II applications. $30 and up.

DBPack II CSH 395.00
Advanced relational DBMS.

DBPLUS SWB 125.00
Inexpensive DBMS writes DIF files.

Filebase EWD 125.00
Menu-driven DBMS with good value.

FilePro CP/M SCC 199.00
DBMS applications generator.

Filer CSH 49.00
Filing and cataloging program.

Friday! ASH 295.00
Electronic filing system.

Infostar MPI 495.00
Off-the-shelf DBMS. Files compatible with Wordstar.

List Master PSC 179.95
Wordpro-compatible information organizer.

CONTINUED...

DATABASE MANAGEMENT

List-Master PSC 179.95
Information manager and organizer compatible with Wordstar.

Notebook DMC 150.00
Free-form database manager.

Palintir Filer PAL 145.00
DBMS compatible with Palintir wordprocessor.

Personal Pearl PRL 295.00
Relational DBMS.

R:base 4000 MIC 495.00
Extensive relational database manager.

SeekEasy COR 235.00
Intelligent error-free-input freeform filing system.

Selector V MAP 450.00
Relational DBMS with report writer.

Unifile UNI 195.00
DBMS with report writer.

SPREADSHEETS

CalcStar MPI 145.00
Wordstar-compatible spreadsheet.

Multiplan MST 250.00
An excellent spreadsheet program.

MYCALC STW 59.95
Easy-to-use spreadsheet.

SuperCalc SOR 195.00
Well-established spreadsheet program.

SuperCalc 2 SOR 295.00
Spreadsheet and data manager compatible with Wordstar, DIF files.

Tax Planner TCS 150.00
Tax templates for popular spreadsheets.

ACCOUNTING

The Accounting Partner STR 395.00
G/L,A/R,A/P, billing, payroll system.

Audit EFH 187.50
Auditing tools for CPA or in-house use.

BCA General Accounting BCA 350.00
Full accounting system.

Bookkeeping System FAR 300.00
Small business G/L accounting.

Business Package VAN 295.00
Business accounting system.

The Champion DBR 495.00
Full accounting system written with dBase II.

Client System CSI 995.00
Full professional accountant's system.

Desktop Accountant RMS 495.00
Integrated accounting system.

Desktop Inventory RMS 295.00
An inventory management system.

Fund Accounting System IMS 650.00
Budgeting for non-profit institutions.

G&G 1040 GGS 600.00
Professional tax preparation system.

Magicheck MGC 59.95
Checkbook accounting package.

MBA Accountant MBA 595.00
Complete accounting w/Supercalc interface.

Mini-Ledger PDM 150.00
Ledger program for small businesses.

Oil & Gas Distributor ALP 1195.00
Accounting and inventory for oil & gas distributors.

Peachtree Accounting PCH ------
Modular accounting system from Peachtree.

Real World Accounting RWS 650.00
Complete accounting system.

Series 9000 PTA UNI 995.00
Time & expense billing for professionals.

Software Fitness Program OPN 525.00
Fully integrated general ledger and accounting system.

Solomon TLB 595.00
Flexible full accounting package.

1040 Plus PLS 550.00
Full income tax package with videotape tutorial.

VersaBusiness Series COM 149.95
A full-featured general ledger program. Receivables, payables, avail. seperate.

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BUSINESS

Ambulance Billing System CPR 995.00
Billing system for ambulance companies.

Application Interpreter CEC 599.00
Estimates, accounting, for contractors.

Cardio VET 195.00
ECG analysis for Veterinarians.

CI System LIT 395.00
Legal firm client tracking system.

Critical Path Analysis SSP 70.00
Business efficiency tool, up to 200 activities and 300 dates.

Daily Reminder & Calendar ICP 39.95
Notebook and appointment calendar.

Daymaster EDS 100.00
Office administration program.

Financial Analysis System VSC 125.00
Collection of real estate analysis programs.

Financial Pak GEN 149.00
Financial planning package.

Forestry Management CPR 1500.00
Forestry harvest & delivery management system.

The Forty-Niner ESI 295.00
Sales prospect management system.

LBS TRI 995.00
Legal billing system for attorneys.

Mailing List ADS 19.95
Requires two drives and 132 column printer.

On-line Order Entry UNI ------
Point-of-sale order entry system with inventory control

Post Card Billing ALP 295.00
Third-party billing system handles thousands of customers for several clients.

Priorities HUL 39.95
Project management system.

The Prospector EDS 300.00
Sales prospect database.

Statistical and Business LEO 100.00
Statistical and business program series, PERT, Monte Carlo, etc. in $100 range.

Sundial Docket & Calendar SBS 149.00
Docket and calendar with client and date searching.

Systat 2 SYS 495.00
Full statistics package with DBMS and graphics.

INTEGRATED SOFTWARE

Personal Planner NMW 99.00
Home DBMS, mail list, letter writer, expense tracker.

Starburst MPI 195.00
A utility which integrates Wordstar, Infostar, Calcstar, and MailMerge.

T/Maker TMK 275.00
Wordprocessor, spreadsheet, graphics. One of few integrated packages for CP/M.

INVESTMENT

Fund-Master GEN 59.95
Mutual funds investment aid.

Investment-Master GEN 49.95
Annuity investment calculations.

Stock & Trend Analyzer NTI 99.95
Stock charting and analysis.

Stock Option Planner TCS 100.00
Cost and results of covered call.

Stock Pricing Model KUS ------
Supercalc overlays for stock market.

UTILITIES

AMX KAD 800.00
Multitasking executive with language interfaces.

ConIX DOS CHI 165.00
Shell-like front end for CP/M--like UNIX.

Datasafe TRG 139.00
Data security encryption.

the best of: CP/M 3.0

CONTINUED...

Diagnostics II SUP 125.00
Checks out your system.

DSKNURSE WDS 15.00
Disk file maintainence and recovery utility.

Eureka! DIS 75.00
Disk file organization and management.

G/L/Supercalc Interface MBA 595.00
Lets Supercalc read and use general ledger files.

INFO-80 TSS 395.00
Application development system. (Hmmm...catchy name!)

Media Master MDC 29.95
Disk format conversion program. Might not work on C128 unless translated.

Nevada EDIT ELC 29.95
Full-screen text editor for program development, etc. Vast improvement on ED.

Pack & Crypt STW 24.95
Encrypts and packs disk files.

P/C Privacy MCT 140.00
Data encryption program.

Power! CMP 99.95
Adds a powerful menu-driven front end to the CP/M system.

SCG31 CCS 75.00
Source code generator.

Supermit ROY 85.00
CP/M utilities.

TUTORI/O ROY 31.00
Animates, debugs, and unleashes BDOS.

Virtual Volume Manager MTI 44.95
Disk file management and maintainence package.

Xtrakey XPS 39.95
Keyboard redefinition utility.

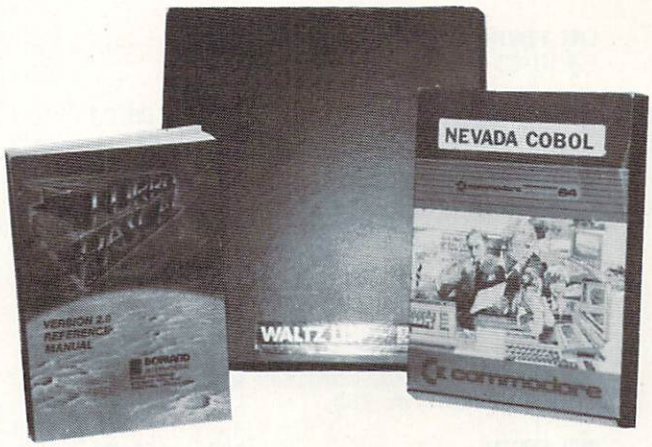
ZED PAS 50.00
Improved text editor.

PUBLIC DOMAIN

Public domain library CRA 8.00
SASE for list. $8.00/disk.

Public domain library ELA 7.50
6000 programs on 300 disks. Catalog is $7.50.

Public domain library NPD 45.00
Rent disks for 7 days to copy yourself: $45/92 disks.



LANGUAGES

Aztec C II MAN 349.00
C compiler for CP/M with utilities, library, UNIX-type I/O, etc.

BDSC BDS 150.00
A well-established and excellent version of C for CP/M.

CBASICCompiler DRC 500.00
Advanced structured BASICcompiler supports Digital's GSX graphics & maybe GEM.

C/80 STW 49.95
Inexpensive C compiler.

C/80 MATHPAK STW 29.95
Add floats and longs to C/80 compiler.

C80 ZDS 45.00
Another inexpensive C compiler.

Cross-assemblers AVO 250.00
A full line of cross-assemblers for most cpu's on the market, from 8085 to 68000.

Janus ADA RRS 300.00
Several ADA subsets available.

LISP/80 Interpreter STW 39.95
Inexpensive LISP interpreter.

the best of CP/M 3.0

CONTINUED...

LMI FORTH LMI -----
FORTH-83 for CP/M systems.

MasterFORTH MMO 100.00
MicroMotion's FORTH-83.

Masterful Disassembler CCS 45.00
Machine code disassembler.

Microsoft BASIC MST 395.00
Combination BASIC interpreter and compiler.

MTBASICCompiler SOF 49.95
Multitasking BASIC compiler w/recursion, windows, etc. for Z80.

MVP FORTH MVP 150.00
The quintessential FORTH implementation.

Nevada BASIC ELC 29.95
BASIC interpreter with BCD math, built-in editor.

Nevada COBOL ELC 29.95
COBOL for CP/M.

Nevada Fortran ELC 29.95
Inexpensive introduction to ANSI-66 FORTRAN.

Nevada Pascal ELC 29.95
Pascal for CP/M.

Nevada PILOT ELC 29.95
PILOT for CP/M.

PL/I 80 DRC 500.00
A subset of the mainframe language for a micro environment.

RATFOR STW 39.95
Inexpensive FORTRAN implementation.

RUNIC-80 STE 50.00
Threaded language similar to Forth, but claimed easier to learn.

68000 Assembler QUE 595.00
Cross-assembler for program development for 68000-based systems (like Amiga).

Supersoft A SUP 300.00
Subset of Ada includes approximately 2/3 of Ada.

Supersoft C SUP 350.00
Optimized C compiler with 130 library functions included.

Turbo Pascal* BOR 49.95
Highly praised Pascal for CP/M systems. Toolbox, tutorial packages available.

UO-LISP NCA 49.95
LISP interpreter and compiler.

WALTZ LISP PRO 169.00
Formidable LISP system for CP/M.

MISC. & GAMES

Adventure ADV 25.00
The original computer adventure in Colossal Cave.

Best of Wok Talk STW 29.95
200 Chinese recipes.

Card-Master GEN 39.95
Credit card management program.

Computer Chef STW 29.95
Personal recipe filer.

ELIZA AIR 45.00
The classic computer psychiatrist.

What's For Dinner STW 19.95
200 family recipes.

Zork et. al IFO 49.95
Many of the Infocom adventures are available for CP/M.

Fancy Font SCI 180.00
Create typeset-quality fonts in a variety of styles and point-sizes for print-out to Epson-compatible printers.

INFO

CP/M VENDORS

ADS Able Data Software
PO Box 86923/Station B
North Vancouver BC

ADV Adventure International
PO Box 3435
Longwood FL 32750
305-862-6917

AIR Artificial Int. Research
921 N. La Jolla Ave.
Los Angeles CA 90046
213-654-2214

ALP Alpine Data
635 Main St.
Montrose CA 81401
303-249-1400

ASH Ashton-Tate
10150 W. Jefferson Blvd.
Culver City CA 90230
213-204-5570

AVO Avocet Systems Inc.
PO Box 490/10 Summer St.
Rockport ME 04856
207-236-9055

BCA BCA
#104/874 Van Nuys Blvd.
Panorama City CA 91402
818-891-0849

BDS BDSoftware Inc.
PO Box 2368
Cambridge MA 02238
617-576-3828

BOR Borland International
4113 Scotts Valley Dr.
Scotts Valley CA 95066
408-438-8400

CCC Civil Computing Corp.
Suite 1/2111 Research Dr.
Livermore CA 94550
415-455-8086

CCS C.C. Software
Suite 106/2564 Walnut Blvd.
Walnut Creek CA 94596
415-939-8153

CEC Construction Estimating Co.
1713 Sutter St.
Vallejo CA 94590
707-552-5476

CET Computer EdiType Systems
Suite 10A/509 Cathedral Parkway
New York NY 10025
212-222-8148

CHI Computer Helper Inc.
PO Box 680
Parkchester Station NY 10462
212-652-1786

CMP Computing!
2519 Greenwich St.
San Francisco CA 94123
415-567-1634

COM Computronics Inc.
50 N. Pascack Rd.
Spring Valley NY 10977
800-431-2818

CON Condor Computer Corp.
2051 S. State St.
Ann Arbor MI 48104
800-221-8479

COR Correlation Systems
81 Rockinghorse Rd.
Rancho Palos Verdes CA 90274
213-833-3462

CPC Caxton Publishing Co.
10-14 Bedford St.
Covent Garden
London England WC2E 9HE

CPR Communications Professionals
Suite 1-238/701 E. Bay St.
Charleston NC 29403
803-722-7572

CRA Cramer
PO Box 28606
Columbus OH 43228

CSH COMPU-DRAW Software House
1227 Goler House
Rochester NY 14620
716-454-3188

CSI Cyberian Software
Suite 140/11222 Richmond
Houston TX 77082
713-558-8090

DBR Data Base Research Corp.
Suite 310/12687 West Cedar Dr.
Lakewood CO 80228

DIS Disco Tech
PO Box 1659/600 B St.
Santa Rosa CA 95402
707-523-1600

DMC Digital Marketing Corp.
Suite 6/23633 Boulevard Circle
Walnut Creek CA 94595
415-938-2880

DRC Digital Research Corp.
PO Box 579/160 Central Ave.
Pacific Grove CA 93950

EDS Executive Data Systems Inc.
Suite 116/290 Interstate North
Atlanta GA 30339
800-272-3374

more

CP/M VENDORS

CONTINUED...

EFH E.F.Haskell & Associates
Suite A-131/528 E. Missourt Ave.
Phoenix AZ 85014
602-277-2534

ELA Elliam Associates
24000 Bessemer St.
Woodland Hills CA 91367
818-348-4278

ELC Ellis Computing
3917 Noriega St.
San Francisco CA 94122
415-753-0186

ESI Excalibur Systems Inc.
1512 Katella Ave.
Anaheim CA 92805
714-385-1211

EWD EWDP Software Inc.
PO Box 40283
Indianapolis IN 46240
317-872-8799

FAR Farmer & Associates
#406/401 21st St.
Sacramento CA 95816
916-441-0554

FYI FYI Inc.
PO Box 26481
Austin TX 78755
512-346-0133

GEN Generic Software
PO Box 790/Dept 20/190 Timber
Marquette MI 49855
906-249-9801

GGS G&G Software Inc.
610 Park Blvd.
Austin TX 78751
512-458-5760

HCS Hilco Software
304 N. 17th St.
Mount Vernon WA 98273
206-428-0475

HOL Holiday Software
4807 Arlene St.
San Diego CA 92117
619-292-7766

HUL Hula Software
PO Box 69
Puunene HI 96784
808-877-5162

ICP International Computer Products
346 N. Western Ave.
Los Angeles CA 90004
213-462-8381

IFO Infocom
55 Wheeler
Cambridge MA 02138

IIS Impact Information System
11205 Alpharetta Hwy.
Roswell GA 30076
404-475-3114

IMS International Micro Systems Inc.
6445 Metcalf
Shawnee Mission KS 68202
913-677-1137

IRR Information Reduction Research
1538 Main St.
Concord MA 01742
617-369-5719

ISA Innovative Software App.
PO Box 2797
Mento Park CA 90066

JIC Jupiter Island Corp.
14 Rock Lane
Berkeley CA 94708
415-528-5265

KAD KADAK Products Ltd.
206-1847 W. Broadway
Vancouver BC
604-734-2796

KUS Kustom Software
665 Pacific View Dr.
San Diego CA 92109
619-483-7119

LEO Lionheart
PO Box 379
Atburg VT 05440
514-933-4918

LEX Lexisoft Inc.
PO Box 1950
Davis CA 95617
916-758-3630

LIT Litek
4326 Fish Hatchery Rd.
Grants Pass OR 97527
503-479-6633

LMI Laboratory Microsystems
PO Box 10430
Marina del Rey CA 90295
213-306-7412

MAN Manx Software Systems
PO Box 55
Shrewsbury NY 07701
800-221-0040

MAP Micro-Ap
Suite 206/7033 Village Parkway
Dublin CA 94568
415-828-6697

MBA Micro Business Applications
12281 Niccolet Ave. S.
Minneapolis MN 55337
612-894-3470

MCT MicroComputer Telecom. People
3 Bala Plaza E./Suite 505
Bala Cynwyd PA 19004
215-668-0983

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CP/M VENDORS

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MDC MDC and Associates
4573 Heatherglen Ct.
Moorpark CA 93021
803-529-5073

MGC Magicomp
2710 W. Country Club Rd.
Philadelphia PA 19131
215-473-6599

MIC Microrim
3380 146 Place S.E.
Bellevue WA 98007
800-547-4000

MMO MicroMotion
Suite 506/12077 Wilshire Blvd.
Los Angeles CA 90025
213-821-4340

MOU Mark Of The Unicorn
222 Third St.
Cambridge MA 02142
617-576-2760

MPI MicroPro International
33 San Pablo Ave.
Bellevue WA 98004
415-499-4024

MST Microsoft
10700 Northrup Way
Bellevue WA 98004

MTI MictoTASK Inc.
Suite 345/6040-A Six Forks Rd.
Raliegh NC 27609
919-851-9045

MVP Mountain View Press Inc.
PO Box 4656
Mountain View CA 94040
415-961-4103

NCA Northwest Computer Algorithms
PO Box 90995
Long Beach CA 90809
213-426-1893

NMW National Microware
Suite 110/2102 Business Cent. Dr.
Irvine CA 92715
714-752-2344

NPD National Public Domain
1533 Avohill Dr.
Vista CA 92083
619-941-0925

NTI NewTEK Industries
PO Box 46116
Los Angeles CA 90046
213-874-6669

OAS OASIS Systems
No.F/7907 Ostrow St.
San Diego CA 92111
619-279-5711

OPN Open Systems Inc.
430 Oak Grove
Minneapolis MN 55403
800-328-2276

PAL Palintir Software
Suite 110/7701 Wilshire Place Dr.
Houston TX 77040
713-520-8221

PAS Pascal & Associates
PO Box 350
Chapel Hill NC 27514
800-972-7225

PCH Peachtree Software Inc.
8th Floor/3445 Peachtree Rd.
Atlanta GA 30326
800-554-8900

PDM Paradigm Consultants
Suite L/39243 Liberty St.
Fremont CA 94538
415-796-0543

PER Perfect Software
71 Murray St.
New York NY 10007

PLS 1040 Plus
6730 E. McDowell/#103
Scottsdale AZ 85257
602-941-3407

PRL Pearlsoft Inc.
PO Box 638
Wilsonville OR 97070
503-682-3636

PRO ProCode International
15930 SW Colony Pl.
Portland OR 97224
800-547-4000

PSC Palace Software Co.
Route 1 Box 320
Moundsville WV 26041
304-843-1600

QUE Quelo
Suite 173/2464 33rd Ave. W.
Seattle WA 98119
206-285-2528

ROY Roy Lipscomb/Logic Associates
1433 Thome
Chicago IL 60660

RMS Rocky Mountain Software
Suite 1292/1280C Newell Ave.
Walnut creek CA 94596
415-680-8378

RRS R.R. Software Inc.
PO Box 1512
Madison WI 53701
608-244-6436

one way

CP/M VENDORS

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RWS RealWorld Corp.
Dover Road
Chichester NH 03263

SBS Sunbear Systems
Suite 404/1095 Market St.
San Francisco CA 94103
415-986-3184

SCC The Small Computer Co.
Suite 1200/230 W. 41st St.
New York, NY 10036
800-847-4740

SOF Softaid, Inc.
P.O.Box 2412
Columbia MD 21045
301-792-8096

SOR Sorcim
2195 Fortune Dr.
San Jose CA 95131
408-942-1727

SSI Sensible Software Inc.
Suite 229/210 S. Woodward
Birmingham MI 48011
313-258-5566

SSP Siem Software Products
PO Box 17684
Tampa FL 33682

STE Starside Engineering
PO Box 8306
Rochester NY 14618

STR Star Software Systems
Suite 103/20600 Gramercy Place
Torrance CA 90901
213-538-2511

STW Software Toolworks
Suite 1118/15233 Ventura Blvd.
Sherman Oaks CA 91403
818-986-4885

SUP Supersoft, Inc.
PO Box 1628/1713 S. Neil St.
Champaign IL 61820
800-762-6629

SWB Software Banc
661 Massachusetts Ave.
Arlington MA 02171
800-451-2502

SYS Systat Inc.
600 Main St.
Evanston IL 60202
312-864-5670

TCS TaxCalc Software Inc.
4210 W. Vickery Blvd.
Fort Worth TX 6107
817-738-3122

TLB TLB Associates
PO Box 414
Findlay OH 45840

TMK T/Maker Co.
2115 Landings
Mountain View CA 94043

TRG Trigram Systems
Suite 66/3 Bayard Rd.
Pittsburg PA 15213
412-682-2192

TRI Tri-L Data Systems Inc.
1538 Makaloa St.
Honolulu HI 96814
808-945-7876

TSS The Software Store
708 Chippewa Square
Marquette MI 49855
906-228-7622

UNI Univair Systems
9024 St. Charles Rock Rd.
St. Louis MO 63114
314-426-1099

VAN Vandata
Suite 107/17544 Midvale Ave. N.
Seattle WA 98133
206-542-7611

VET VetSoft
1716 Pomona Dr.
Davis CA 95616
916-75-7022

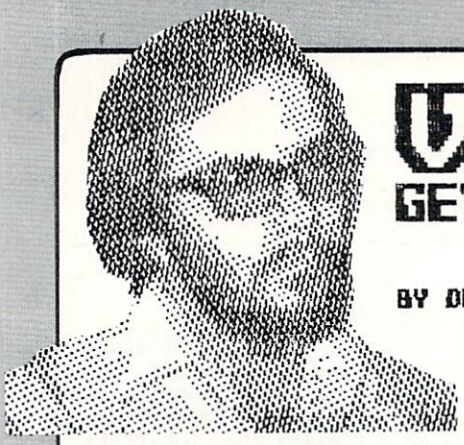
VSC Valuation Systems Co.
Suite E 236/7130 S. Lewis St.
Tulsa OK 74136
918-496-7655

WDS Webb Data Systems
PO Box 2068
Topeka KS 66601

WRC Writing Consultants
Suite 304/11 Creek Bend Dr.
Fairport NY 14450
716-377-0130

XPS Xpert Software
8865 Polland Ave.
San Diego CA 92123
619-268-0112

ZDS Zeighty Data Systems
PO Box 28355,6/0 JC
Columbus OH 43228
614-279-8271



VIZASTAR8
GETTING INTEGRATED

BY DON VANDEVENTER

INTEGRATED SOFTWARE!

Integrated Software! This has become a very important feature of the larger computer systems. But what is **Integrated Software** anyway?

Stated in its simplest form, **Integrated Software** is a combination of software programs such as a spreadsheet and database that share information (**Lotus 1-2-3** being the most famous of the lot). This is not just two separate programs sharing the same information, but two separate parts of the same program. Until now it was held by many critics that the Commodore 64 could not really handle an Integrated Software package, but a new program by **Kelvin Lacey** has changed that.

A DREAM COME TRUE

That was the headline of the ad that first caught my attention last January. The real eye catcher for me, however, was the name of the author of **VIZASTAR. Kelvin Lacey!** For those of you who read **Info 64,** you know that I bought my Commodore 64 because of Kelvin's word processor **"Omniwriter".** (See review of **Omniwriter,** issue #4). After a call to the distributor, **Solid State Software,** I was jumping up and down wanting a copy of this new program. However, I had to wait until the **West Coast Commodore Show** in February before I finally had a copy of the program in my hands.

WHAT'S WHAT

Before we can really look at **VIZASTAR,** there are a two words that we need to define. The first is **Spreadsheet:**

A spreadsheet is one of the most powerful business tools available on a computer. To understand a spreadsheet think of a columnar pad of paper. The lines down the page are columns, and across the page are rows. The boxes created by this format are called cells. Most of us have seen this format in ledger sheets. A spreadsheet is a large electronic ledger. In the case of **VIZASTAR,** a ledger with 64 columns, and 1000 rows. With a paper ledger sheet, existing figures in the cells must be recalculated everytime a new figure is entered or changed. The power of the spreadsheet is that the math formulas are entered first, and when new figures are added, calculations are automatic. Saving hours of recalulations. Spreadsheets can be used for management or accounting purposes either at home or in business.

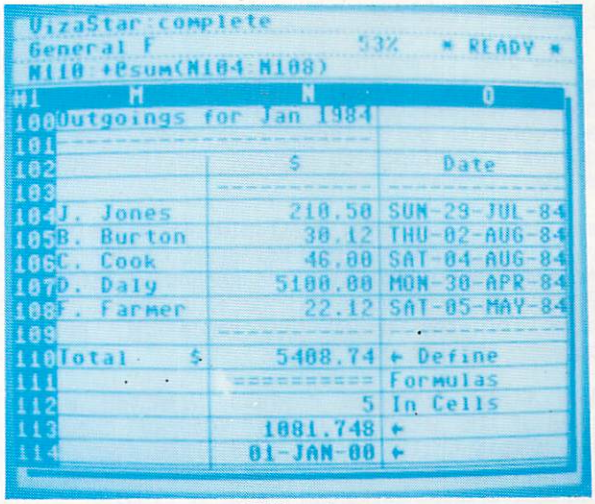


FIG. 1

The second of our words to define is **Database:** imagine a file cabinet with file folders. Each file folder has a sheet of paper with places for information such as name, address, city, state, zip, etc. The file cabinet is our database. A single file drawer becomes our file. Within the file folders are the individual records. Each line of entry in the file (name, address, etc.) is called a field. Just as you can design your file cabinet with any type of information you want, the same applies to a file in a database. But the advantages of a electronic database are: speed, ease of use, and "if-then-or else" types of analysis. Say you need to find all of the people that own both a C-64 and a 1702 color monitor in a local user group file: a good database will look though each record and find only those that qualify.

Now we come to **Integrated Software.** Imagine being able to combine information from the two types of programs we just discussed. For example, you have used your spreadsheet to create an invoice. Your database contains two files, the first is your customer mailing list, the second your invoice information. By using the power of both spreadsheet and database, the customers' information can be merged with the invoice information to be calculated and printed. Two difficult jobs handled by one program.

Kelvin Lacey has taken this idea several steps further. First by creating a program that permits the use of the Commodore graphics to create bar graphs, line charts, pie charts, or multi-bar charts of your information, then by allowing any of your information to be merged with a word processor.

INSIDE VIZASTAR

It took over 15 months for Kelvin to write **VIZASTAR.** The program is written entirely in 6502 machine language and resides completely in memory. Since the program is quite large, over 48K, the program requires a cartridge to provide addition memory for the C64.

There are two versions available of **VIZASTAR.** The first is **VIZASTAR XL4** providing a work space of **10K** (the same as **Multiplan**). The second version is the **XL8** providing 40% more workspace a total of **14K.** (Note: for the small difference in price, I recommend the **XL8** version)

Solid State Software markets **VIZASTAR** with two copies of the program, a well indexed manual, the extra memory cartridge and a complete step by step tutorial. In addition, on the disk is an second tutorial, a demo worksheet, and a simple cashbook format that can be used instantly.

The documentation is extensive, but there are some flaws in the material. The most recent copy I have has a page added to showing about 15 corrections (most minor) which still need to be made in the book and tutorial.

There are also a few problems with screen dumps. Most printer and interface combinations work, but it has taken some fooling around with my **Star SG10** and **Easy Print** interface to set the dip switches right. Upon dumping the first screen, the printer sends too many line feeds, following screen dumps are fine. I often just reset my interface to emulate a Commodore printer and that solves the problem. This quirk only appears in screen dumps; the normal print menu works fine and I can use all of the special features of my printer and interface. Both **Solid State** and **Progressive Perphirals** (distributors of **Easy Print**) are both working on the compatibility issue.

THE POWER OF VIZASTAR

In **figure 1** the top section contains information about the worksheet you're working on. The first line gives the name of the worksheet, in this case it is called 'complete'. The second line gives the format of the cell where the cursor is. The cell formats can be: **General** (displaying the entire number), **Integer** (rounding the number off to a whole number), **Currency** (displaying two decimal places and rounding up if needed), **Date** (displaying day, month, year and if the cell is large enough, even the day of the week), or **Scientific** (displayed in scientific notation as a power of 10.

On the same line you will find the amount of memory left in your worksheet. In our example I have 53% of my worksheet free. (Remember you're only seeing a small window of the whole worksheet). This line also tells you whether the program is calculating or not. Here the worksheet is ready for the next step. The bottom line gives both the cell location of the cursor as well as the contents. In our example we have a formula. The formula simply says "add all of the cells from N104 to N108 and place the total in cell N110".

The Main Menu is reached by pressing the Commodore key. If you're familiar with **Lotus 1-2-3** you will see a similar menu in **figure 2.** The first line shows the main commands **'Cell, Sheet, File, Print, Data, Graph'** Below that is the secondary command line. For **Cell** there is **Format, Calc, Protect,** etc.

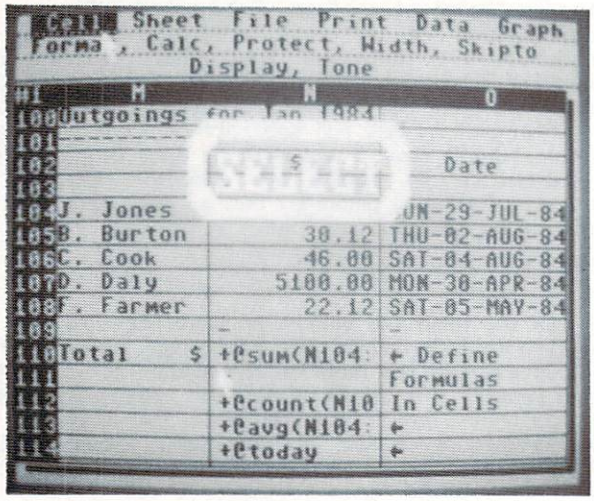


FIG. 2

The command **'Cell'** is currently highlighted, and if you press return the second line of commands will move up to the first line and a whole new line of commands will appear at the bottom.

An easy way to understand the command line is think of the limbs of a tree, the first line (limb) takes you to the next limb or line of commands. Commands may be chosen by pressing the space bar to move the cursor or by pressing the first letter of any command. For example; pressing the commodore key and 'c' for cell, then 't' for tone takes you to the Color Menu. Then you can adjust the color of the text, background and border of your worksheet. After working with programs like Practicalc II where only the first letter of the commands are given I found the commands of **VIZASTAR** easy to learn.

Notice the location of the cursor in 'N110'. I have changed the program using one of its functions to display the formulas. Due to the width of this cell the entire formula is not displayed. However, it is the same formula that is shown in **figure 1.** The

more

formula below it says to count the number of entries between 'N104' and 'N108' and display. In **figure 1** you will see the answer is five. The next formula says to average the figures between 'N104' and 'N108' and display. **Figure 1** shows the number to be 1881.748. This cell could have been set to currency and the figure would have been rounded off automatically. The next formula is to display today's date. The program will keep track of all dates including leap years from January 1, 1900. At the beginning of using the spreadsheet you can enter today's date and it can be used in any formula where dates are needed. For example, a customers record that is due in 30 days could automatically display the due date.

Several different functions can be used in formulas. First there are the standards like add, subtract, multiply and divide. Others include: **abs** - absolute value, **cos** - cosine; **log** - value is a natural logarithm base; **max** - the maximum of all values in a supplied range, **min** - the minimum of all values in a supplied range; **pi** - for a value of 3.14159265359 for radius; and **tan** - tangent. These are just a few of 32 different functions in addition to equal, not equal, less than, less than or equal, greater than, greater than or equal, logical OR, logical AND, logical NOT, true, false, and if-then statements.

Before leaving **figure 2** notice the different sizes of the cells. Cells can vary in width from 3 to 36 characters. Up to 120 characters can be typed in a cell

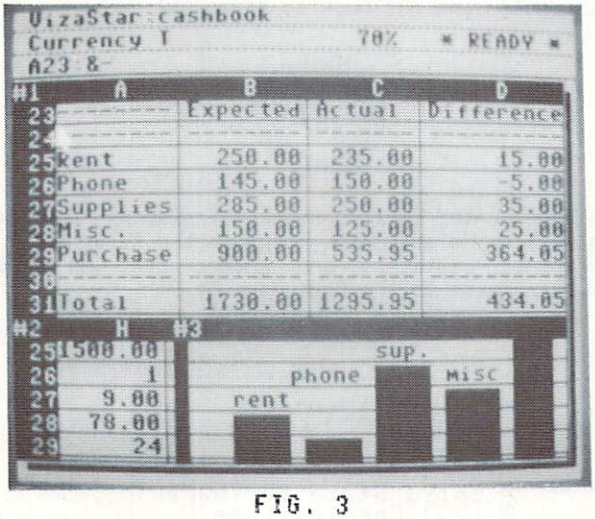


FIG. 3

WINDOW ANYBODY?

Figure 3 shows yet another powerful feature of **VIZASTAR**. The ability to show windows. This permits you to see various parts of the spreadsheet at one time. For example in the first window you see the cells from 'A23' to 'D31', and in **window 2** from 'H25' to 'H29'. **Window 3** has a graph taken from the figures in **window 1**. A total of 9 windows may be opened. This permits you to temporarily look at another part of the worksheet.

Another nice feature is titling. With this feature, it is possible to lock any row, or column (or both) in any window. By using this feature, cells may be moved and the title of the cell is still displayed. However, using titling reduces the number of windows that can be displayed. Text within a cell can be left or right justified or centered. This helps in producing better looking copy when printing reports. In the print mode, a set of options permits the use of headers, footers, auto page numbering, and printing of specific ranges of cells. In addition, special print commands such as condensed printing (if your printer supports it) can be used.

One of my complaints about the program is its inability to save only a portion of a worksheet. On the plus side, all of your system parameters are saved along with your worksheet including tone, windows, graphs, print commands, and last commands used. Worksheets can be merged together, and you can also merge text created by a word processor or sequential files directly into the worksheet.

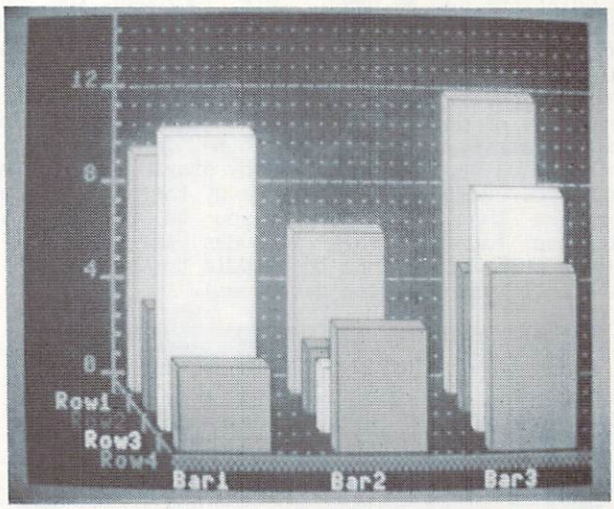
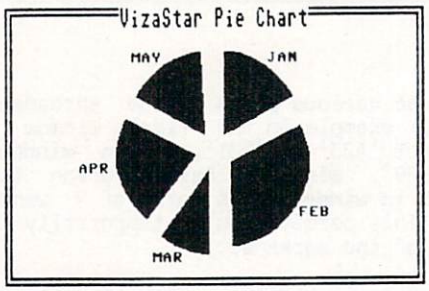


FIG. 4

VIZASTAR provides an additional graphics function to print on screen full color pie charts or multi-bar graphs. **Figure 4** shows an example of the multi-bar. There are two scales that can be displayed and the number of bars that can be displayed range from 33 if only one row is used to 13 in each row if bars in all four rows are used. Heading, as well as labels can be included in the chart for better appearance.



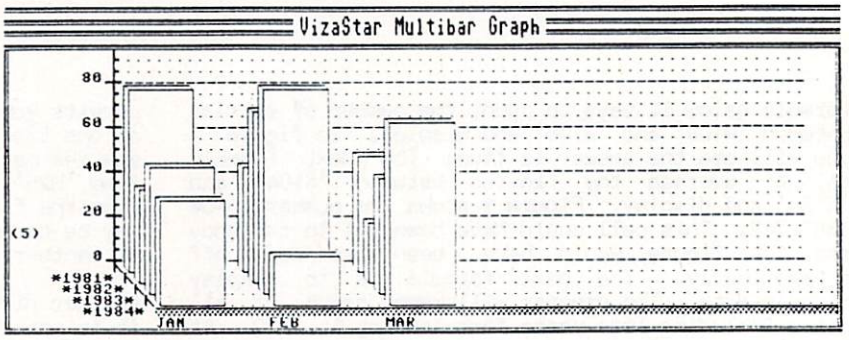


FIG. 5

On screen the cursor keys are used to move around the multi-bar chart. **Figure 5** shows a sample of the print-out of both the pie chart and the multi-bar chart (most printer, including the MPS 801 can be used to print the charts)

In **figure 6** you will see a sample of the information in the database. Up to 9 screen pages can be used with up to 64 different fields. A total of 120 characters per field or 8000 characters per record. The key field (only one allowed) can only handle 30 characters. The maximum number of records a 1541 disk can handle is 1200. Other drives, including a hard disk can be used with the program for a maximum of 65535 records. The maximum number of databases per disk is 120, and 15 different files per database.

In laying out your database, all of the spreadsheet calculations can be used. This includes the date functions, making invoices easy to handle. Information in the database can be used in the spreadsheet permitting a large assortment of applications. Sequential files created by other databases or word processors may be imported into the database. This saves time in transfering information you may have already stored in another database. **VIZASTAR** is also one of the few database programs that will permit you to redesign you database format. This includes the ability to insert information into the middle to the record (a difficult task for most databases).

FIG. 6

LOOK MA, NO HANDS!

The last feature I want to mention is one of the most powerful; the **Exec** function. **Exec** gives you the ability to write a macro command that will permit the program to run itself! Lets say you design a spreadsheet for employees to use, and you want them to enter information in only in certain cells. You can write an **Exec** function that will permit them to enter information only in the appropriate cells, with the cursor moving to each of the selected locations automatically. Writing Exec functions is not hard: as you perform each function write down the first letter of the command used or the cell location. You then transfer this information to an empty area in the first column. When the **Exec** function is used the commands will follow the same order.

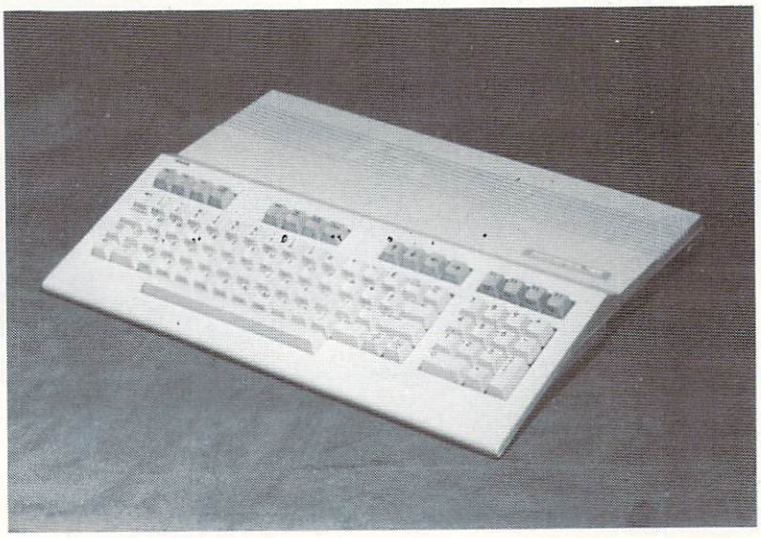
I could go on and on talking about this program, & I realize that I have only told you about a few of its many features, but I promised Benn that we would keep it short, and besides I want to stop working on this review and get back to **Vizastar!**

INFO

Don Vandeventer is a consultant for small and home businesses. He is on the board of the Association of Electronic Cottagers and author of the Small Business Guide to the Commodore 64.

VIZASTAR

$119.97
Solid State Software
1253 Corsica Lane
Foster City, CA 94404
(415) 341-5606



VIZASTAR 128 ??

SOLID STATE SAYS, "VERY SOON"

1-2-3 FOR THE 64??

by Ernest Miller

It sure looks a lot like **LOTUS.** But is it really destined to become the spreadsheet benchmark for the Commodore that **1-2-3** has become for the **IBM PC** world?

The similarities start with the tree-structured COMMANDS. This approach gives the user the same visibility of available COMMANDS and SUB COMMANDS, with the same step-by-step command execution process. Like **LOTUS,** you can point to the desired function, or execute it by typing the initial.

The worksheet manipulation power is impressive, when compared with any spreadsheet program. Cell formatting, recalculation choices, range move/insert/delete operations, copying, titling, column width adjustment, windowing, and cell protection provide all the worksheet options that are desirable.

Formula and function power is equally impressive. Besides standard mathematics operations, **VIZASTAR** has a full range of higher level functions, such as MIN, MAX, SUM, AVG, LOG, etc. There are 30 of these formula functions, which include table lookup capability and DATE manipulation.

Both **1-2-3** and **VIZASTAR** have database management processes. To the user, **VIZASTAR** looks more like a dedicated database program, rather than just another way to manipulate data contained in a spreadsheet. Record layout can be designed and manipulated without direct reference to the underlying spreadsheet, which is what is really doing the work.

The graphics displays, both on-screen and printed, are superior to any other I've seen. Several varieties of bar and pie charts are available.

While the documentation is somewhat less comprehensive that **LOTUS** it's adequate. With any powerful spreadsheet or integrated program, a lot of practice is needed to master the full range of capabilities, and **VIZASTAR** is no exception.

I found that **VIZASTAR** would do anything **1-2-3** could, and then some. It's my Commodore choice to become the standard against which the others will be judged.

Note: Mr. Miller is a computer instructor in Ocala, FL and teaches **LOTUS 1-2-3.** He was also a major contributor to **The Small Business Guide To The Commodore 64** by Don Vandeventer.

COMPUTER SPEECH

by: Ted Salamone

Almost since the inception of the modern computer engineers have been trying to develop the right combination of software and hardware; the one that would both produce and recognize human speech.

The major drawback to designing the needed algorithms and devices is the complexity of mankind's utterances. Not only are there millions of words in hundreds of languages; the technical types also have to deal with local accents and personal inflection. Also, there are many times when a specific word can be understood (by humans & computers alike) only because of the context in which it is used.

The technical challenges notwithstanding, both speech (voice) synthesis and recognition are now coming into their own. Numerous design teams have spent, and are continuing to spend, untold hours refining and advancing the most promising methods. While it's true that the major advances are made on hardware costing megabucks, the nuts and bolts of the research soon trickle down to end users equipped with nothing more than mere (!) home computers like the still unequalled **Commodore 64.**

First of all, computer speech can be approached from two different angles, the rule or the analysis method. In the former, a set of phonetic guidelines directs pronunciation; while the latter plays back digitally recorded vocabulary when required.

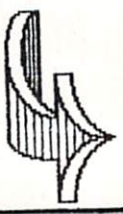
The first approach is by far the more flexible of the two, though the results are somewhat less than optimum. Often words are reproducible (or can be understood) only after repeated exposures (training, as it's known in the business). On the other hand, synthesis by analysis creates amazingly lifelike speech. The main problem, and the reason it's not the more prevalent method, is that it requires massive amounts of memory. Personal computers with 64K or less just don't have what it takes. That meager amount of memory would be gone in a flash, leaving room for nothing else. Now, that's not my idea of a fun program.

Besides the obvious need for hardware and software development knowledge, synthesis/recognition developers need to understand the basic structure underlying all human languages, **allophones.** These universal phonetic symbols are to human languages what zeros and ones are to computer languages. **allophones** recognize no barriers; utilizing the full range of symbols you could create computer speech (or recognition capabilities) in any dialect of any language ever spoken, currently spoken, and (probably) any yet to be spoken!

Before we discuss the pros and cons of specific hardware and software I'd like to provide you with a little background on the more esoteric of the two subjects covered in this article, speech recognition. This procedure allows a computer to identify (and act upon) words which the system is trained to understand. It's somewhat like teaching your pet collie to fetch the evening paper. It is not to be confused with verification procedures where computers are used for security, giving people access to information or locations based on a match between preprogrammed voice data and "live" samples of the same words or phrases. Speech recognition is concerned with what was spoken, verification with the person behind the sound.

Recognition procedures can be broadly classed accordingly: speaker dependent, speaker independent, discreet utterance or continuous utterance. Each method has its pluses and its minuses.

Speaker dependent systems need to be trained to acknowledge particular words from a particular speaker. Repeated input of the same word allows the computer to average the samples, theoretically permitting greater recognition accuracy. Just resist



COMPUTER SPEECH

continued...

the urge to do imitations while cranking up the system! On the other hand, speaker independent systems understand a preselected set of words as spoken by the majority of the population. Sounds great, but there are flies in this ointment too! These systems can only be "trained" by the manufacturer in his factory at considerable expense. Secondly, the vocabulary of any such system is severely limited in scope. They are most useful in situations where single word commands can be issued, factories, military installations, etc.

The discrete versus continuous matter merely addresses how much time is needed between each word for proper recognition. With a discrete (think digital) system you must speak in a slightly stilted manner as a pause (we're talking milliseconds here) is required between each utterance. Continuous (analog) recognition permits more realistic/lifelike input, though it will cost you a pretty penny to achieve. One thing's for sure, it won't be around for the 64 until those recently announced 20 and 80 meg hard drives become staple items.

Today's market for **Commodore 64** speech synthesis is divided into software only and software/special hardware offerings. The software only side of the coin utilizes the 64's internal SID chip. The combination approach makes use of an additional piece of hardware specifically designed to improve upon SID's capabilities or to provide ones it (he ?) can't supply. Simple enough. The software side is divided into mass marketed and second party (do it yourself) programs; of which the latter are primarily written for specific pieces of hardware like **Votrax**'s **Type 'n' Talk** or their **Personal Speech System.** There is actually quite a variety of commercial software which will make a micro speak without hardware. Most of it runs on the **Commodore 64,** mainly because of its aforementioned dedicated synthesis chip.

Muse has been at the forefront here; when adapting their smash Apple hit (**Castle Wolfenstein**) to the 64, they added voice output. This is probably the first example of speech synthesis (in a foreign language) on a home computer! Nazis bark ten different statements, including "Achtung!" and "Kaputt". The normally harsh intonation associated with software driven synthesis only adds to the flavor, for German is a very guttural language. Remember that "Kamerad". While **Muse** repeated their feat in the sequel, **Beyond Castle Wolfenstein,** their greatest verbal achievement is, without a doubt, **Space Taxi.** This game offers the clearest, crispest voice this side of **Michael Jackson.** A soprano-like voice hails cabs (Taxi, hey taxi!) and gives directions to gamers by stating the desired destination (as in "Pad 5, please.").

Another leading software firm, **Tronix,** offers an educational game entitled **Chatterbee.** It's a computerized spelling bee where the target word is pronounced singly, then in the context of a simple sentence. As responses are typed in, each letter is read aloud. Completely software driven, it uses procedures developed by **Don't Ask Software.** As with most of its competition, careful attention must be paid to it, for some of the words are difficult to comprehend at first.

S.A.M. (Software Automatic Mouth), also by the **Don't Ask/Tronix** team, is a voice synthesis utility program. With it, budding programmers can easily add speech to their own masterpieces. While not a game in its own right, it has been used in several, and is responsible (to no small degree) for the heightened awareness of the availability and quality of inexpensive voice synthesis software for the home market. The audio output from this program rivals that from any of the special hardware devices discussed later in this article.

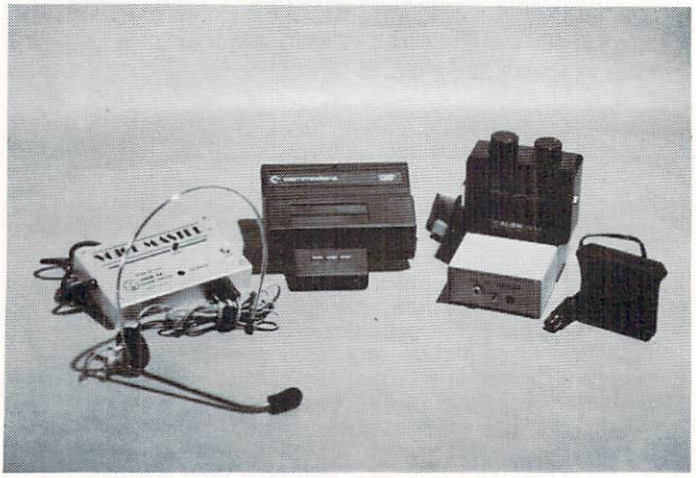
The hardware side of the universe is, without a doubt, a more expensive proposition. Without software telling them what to do however, these devices are nothing but mute testimony to the art of making plastic from the remains of long dead reptiles.

One of the more readily available, and affordable, speech synthesizers is the **Alien Group**'s **Voice Box.** This tiny wonder also works with computers other than the **Commodore 64.** A nice touch is its inherent ability to sing. While it will never be a feature soloist at the Met, it does add charm and whimsy to synthesis, an output that has historically been considered cruel, harsh and mechanical. (Just think of all the mock synthetic voices that issued forth from alien devices and robots in B movies done in the Fifties!). Whether you write your own software (using the demo program for suggestions), or purchase the singing software package entitled When I'm 64, the **Voice Box** will amaze.

A rudimentary graphics editor allows you to change an on-screen sing-along face which mimes the words spewing from the speaker. With some tweaking here and there you might get the lips to move with the words, or perhaps even turn it into a portrait of the most handsome/beautiful person you know - yourself! (What an ego you must have!).

COMPUTER SPEECH

continued...



The machine, which plugs into the user port, is sturdily constructed, is compact in design, and is supported by its manufacturer. Besides a volume switch and an external speaker jack (eighth of an inch), the Box also has a unique pitch dial for direct manual control of that ever so important function. Putting it through its paces speeds up or slows down the output, making words run the gamut from bass to soprano in one quick hurry.

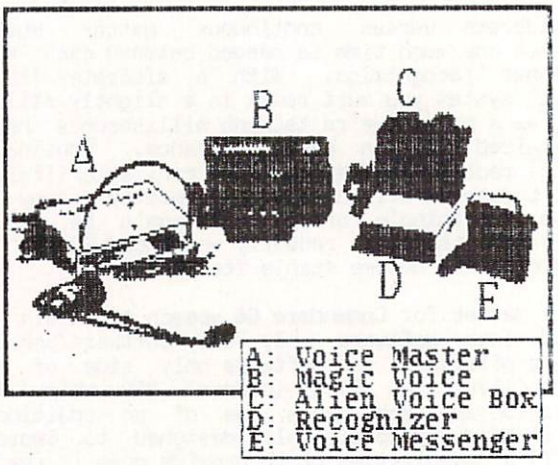
Though its manuals, and those of compatible software from Alien, are a chore to decipher, they offer valuable tips and insight on how to achieve the device's maximum potential. Be prepared for unclear sentence structure, typos, and the look of second or third rate printed matter. While this ancillary material is important, it doesn't lessen the value or considerable capabilities of the machine itself. A little TLC will go a long way with the **Voice Box. Recommended.**

Newer, less expensive, and intended strictly for the **Commodore 64** we have Commodore's own **Magic Voice Speech Module.** This unit, which plugs into the 64's cartridge port, works with special carts as well as user written programs in BASIC or assembly language. When operating under second party software control it produces a pleasing female voice. Its preprogrammed library of 235 utterances is too small for any serious work however. Another problem is the need to repeatedly issue the BASIC command SAY for each spoken word. Luckily, the former problem will all but disappear when (if) additional (disk based) vocabularies hit the market. To alleviate the other, learn assembly fast.

Currently Commodore sells four compatible carts, **Magic Desk I, A Bee C's, Gorf,** and **Wizard of Wor.** The last two titles make good use of the synthesizer's exceptional range by spewing forth a variety of threats, warnings, and insults. This output appears to be more random in the **Wizard** than in **Gorf,** where some of the statements are heard only after certain conditions are met. Either way, the speech (in a voice befitting each scenario) adds new freshness and enjoyment to these old standards. "Beware, you are now in a Warlord Dungeon!". "Some galactic defender you are Space Cadet!"

I didn't have a copy of **Magic Desk I** on hand for this review so I can't discuss the pros and cons of its speech synthesis features. Some users have found it to be a practical icon-based office management tool without verbalization, so (with any luck at all) the added vocals will only improve its usefulness. Commodore's **A Bee C's** is an educational product which, unfortunately falls into the same untested category as **Magic Desk I.**

speech hardware



Just by the head count above you can see that the device is not heavily supported. (There are no third party products whatsoever!). There haven't been any recent compatible software releases and, worse than that, the additional text libraries are nowhere to be found. This seeming lack of support is more the pity because the device itself is solidly built and a bargain at its (widely) discounted price. Its covered, spring loaded cartridge port is designed to prolong the life (and good health) of your investment. RCA input and output jacks make it possible for you to connect it to any number of external audio devices. (I run all my audio through a Panasonic RX-F3 AM FM stereo cassette for some awesome audio output. The $120.00 (list price) portable unit has built in RCA jacks, a one eighth inch (micro) headphone jack, two internal condensor mikes and operates on 6 "C" batteries or a (provided) plug in power supply).

Last but not least, the 26 page manual is logically organized, easy to read, and full of useful information. If Commodore makes a more meaningful commitment, then by all means add the **Magic Voice Speech Module** to your system.

one way

COMPUTER SPEECH
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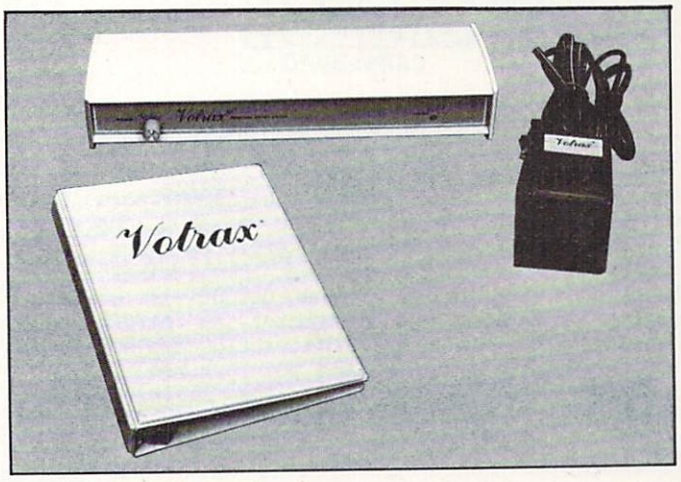

Our next entrant in the synthesis sweepstakes has journeyed 'cross the Atlantic from Jolly Ole England. Having set up an American base of operations in Massachusetts, **Currah Technology** (and its **Voice Messenger Speech 64**) are set to take on all comers.

A compact device not much larger than a standard game cartridge, the **VM** operates from the 64's expansion port. A 5 pin DIN connector on a short lead emerges from the backside. Thanks to a supplied adaptor cable you can hook it up to a monitor or your home TV. Using a monitor with its own audio capabilities you can then direct the speech through your stereo.

Judging this device by its size is a mistake for it packs quite a punch. (Reminded me of David against Goliath). Once the cart's plugged in and the 64's fired up, a keyboard voice mode takes over. Pressing any key (98% of them anyway) produces vocal output identifying the selected key. Hit RETURN and you'll hear "return"; press ± and you'll hear "pound". Don't wait for a cockney accent however, it's not there. The **Voice Messenger** offers something better instead, two easy to access voices. One's high pitched, the other low. Male and female if you please, though they're never referred to in that manner.

As with every function offered, the voices can be programmed in BASIC or machine language. Five commands are added to BASIC when the system is running, though machine language expands your horizons even farther. You just need the additional language experience to tap in.

Like the other devices, **allophones** can be used instead of plain English to create speech, while non-vocalized characters are inserted to control intonation and inflection. **allophones** once again produce the best output.

A 256 character speech buffer is standard, enough space for approximately twenty five seconds of computerized chatter. Its secrets are unlocked in the small yet comprehensive manual accompanying the likewise diminutive yet powerful hardware portion. The manual concludes with a sample program, the additional BASIC commands and a decimal/hex/**allophone** conversion table. The latter is quite valuable indeed.

Despite its recent arrival on our shores, the **Voice Messenger** already has picked up some third party software support. (Pay particular attention to the programs mentioned under the **R.I.S.T.** portion of this article). I like this one!

The next two machines come from the same stable, **Votrax.** Both are sleekly styled units which emulate printers as far as the 64 is concerned. The **Type 'N Talk** has an RS-232 serial interface, while the newer device, the **Personal Speech System** (**PSS**), has both serial and parallel ports. Ready made, Commodore specific interface cables are available from **Votrax,** making installation a snap. Naturally, you must pay extra for them!

Neither unit comes with any software, though most programs with output to a printer work just fine. For example, adventuring takes on new meaning when play by play commentary has been added.

Infocom's Witness, Infidel, and **Cutthroats,** etc. go one step beyond the usual. As a matter of fact, the entire series works with the **Type 'N Talk.** They also work with the **PSS,** though this isn't specifically mentioned in the manual. The speech makes you feel safer, better able to handle the dangers that lurk ahead because it seems as if there's really a companion at your side.

These machines probably produce the best speech (**S.A.M.** is close though) of all the items reviewed here. At just under $200 for the **T-'N-T** and $395 for the **PSS** they should. (The latter also has numerous other capabilities, including generation of musical notes).

There are hardware devices available now which can create more lifelike speech than either, but they cost 9 to 10 times as much as the **Personal Speech System** alone. Thus, for affordability and performance, the **PSS** is near unbeatable. Let's find out why.

Votrax has opted for broad horizons as they've based its workings on the synthesis by rule system. They've also managed to include a number of non-speech functions in the **PSS,** most of which are related to musical output. While there's plenty for novices to sink their teeth into, advanced computerists will find it exciting too. The combination of expandable onboard ROM, Z-80 software download capabilities, and an **SC-01** phoneme (read allophone) synthesizer chip allows the **PSS** to operate in conjunction with modems.

COMPUTER SPEECH

continued...

Besides the parallel and serial interfaces (one each) standard features include a 3500 character buffer and an internal speaker. The rear panel sports an 1/8" external speaker jack (Walkman type headphones work, though the output is strictly mono), a 5 pin DIN power connector, an on/off push button switch, and eight configuration dip switches. The volume control knob and a power-up red LED are located on the front panel of the sleekly styled metal case. The **PSS**, with a 12.25" x 5.2" footprint, weighs in at a mere 2.6 pounds. It's actually portable!

A vinyl clad, three ring mini manual contains system particulars as well as operating commands and user instructions. A separate quick reference card and **Phonetic Speech Dictionary** round out the paperwork. The main manual, though generally well organized and all encompassing, does present some pitfalls for first time users. The examples for non-speech output are listed in the context of speech creation as far as programming (BASIC) conventions are concerned, but nowhere is this plainly stated. Just remember to include PRINT commands and both sets of quotes whenever you want any audible output. Since the device is purchased without software users either write their own or run commercial programs which output to a printer. (Computers think the **PSS** is a printer. See, they can be fooled!)

Once beyond startup there is an air of excitement about using the **PSS.** Exploring and experimenting with its many functions is an outrageous experience. Delving into the speech functions can be particularly captivating.

For speech data the **PSS** accepts text or phonetic input. Inflection, amplitude, and rate of verbalization are all independently controllable. The non-speech functions include music, sound effects (white noise is possible), customized alarms, and a programmable clock. Until you learn the command structure (it really shouldn't take long), the reference card comes in very handy. Normal English text can be spoken if it's programmed like output to a printer:

```
20 PRINT "Votrax does it right."
30 PRINT "It took me two hours to write this program."
```

Don't overlook the use of **Phonemes** either. The **SC-01** synthesis chip contains 64 of these language building blocks. (Think of them as atoms.) Proper combinations of these mighty mites is all it takes to create speech. The phonetic sequences are input as standard ASCII characters. Approximately 1400 English words and their phonetic equivalents are in the Speech Dictionary. Couple this knowledge with the phoneme to ASCII table in the reference card and you're set. **Phonemes** permit crisper speech and (usually) faster response time as the data doesn't have to be translated prior to output.

Non-alphabetic, printable ASCII characters serve as command and control characters. Among these are the question mark and exclamation point. Others, ($, &, %) are treated as spoken punctuation marks. This organized structure seems to cover all the bases.

The **Personal Speech System** is actually a misleading moniker because of the ease with which it generates musical tones. Capable of reproducing 96 notes, sporting three sound channels, and able to handle user selectable duration it is useful as a companion piece to the 64's SID chip. For example, note A#2 on channel two would look like this:

```
20 PRINT "!2230."
```

Though simple to do, the results can be simply fascinating!

The programmable clock feature is useful for many tasks, including incorporation of alarms into custom programs. Once set, an easy process by the way, the Automatic Time Annunciator chimes every quarter hour, with or without voice. This can be a real lifesaver for hackers who tend to forget about the rest of the world. (For some reason wives don't appreciate being picked up an hour late just because you have a new toy to play with.) Alarms!, they're another matter altogether. Users can not only set from one to eight at a time, they can even add text statements for output at the specified time(s). Message size is limited only by the amount of available memory. These prompts can be made to address a wide range of situations in the home or on the job.

The inflection, rate , and amplitude commands fine tune the verbal output of any words or phrases they precede. More lifelike speech can be created through skilled combinations of these parameters. A little practice is all it takes.
Other commands allow computerists to change the baud rate, in predetermined steps, from 75 to 9600 bps, create an amplitude envelope for non-speech generation, and alter filter settings for various voice and sound effects. The envelope feature is particularly complete as users can define the attack and decay rates as well as the sustain and release levels of any of the three channels. There's even an attack delay option!

Z-80 code can be loaded and executed with just a few keystrokes, pronunciation exceptions likewise. Prompts (toned down alarms), noise generation, and tempo are some of the other easy to master features. Most of these can be made more flexible by the wait (delay execution) command. The true depth of the **PSS** isn't readily apparent, it takes time to discover its true colors. Advanced users can redefine pre-set characters (like % and &) or allocate memory in 256 byte blocks while anyone can perform warm starts or quit execution through software control.

COMPUTER SPEECH

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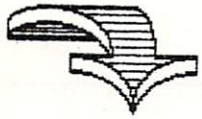


Numerous appendices provide information ranging from adjusted spelling examples (elocution exceptions) and a phoneme conversion chart to error code listings and a musical note chart. Cable wiring diagrams, dip switch settings, and programming samples (in BASIC) for various computers are also included. Default settings, Z-80 memory and input/output maps, and a hex to decimal conversion listing pretty much round out these tables.

There's more to the **PSS** than I can possibly squeeze into this critique. Suffice it to say that application of your time and effort can yield big results. You can even program it to pat you on the back for a job well done. Just try that with your boss or teacher! Using the **Personal Speech System** has been an enjoyable, educational experience. Its uses are bounded only by your imagination. Certainly the new worlds it opens for the visually impaired cannot be overlooked.

The **Type N' Talk** provides the same high quality speech synthesis output as the **PSS,** though it does not have the extended musical and alarm features of its bigger brother. The 3500 character buffer and the modem download features aren't included either. However, the same phonetic synthesis by rule algorithms are employed, the **SC-01** and Z-80 chips are present, and front mounted frequency and volume dials are provided for quick and easy adjustment. Tho its design is a little less inspiring than that of the **PSS,** the **T N' T** is still compact and streamlined.

Now that we've covered synthesis only software and hardware we'll move on to two devices which go one step beyond - voice recognition. Though their physical appearances are dissimilar they work in the same manner. However, the fruits of their labors are different.

First out of the batter's box is **Covox**'s **Voice Master,** a device actually smaller than the floppy disk supplied with it. Besides the "magic" box itself, purchasers of the **Voice Master** receive cables for TV or monitor hookup and a no-hands, combination microphone/headset that fits snugly around one's head, freeing your hands for other duties. The advantage to this setup is more accurate, consistent recording quality. That's right gang, the **VM** must be trained before it will recognize words. Several banks of words can be stored, altered, or otherwise manipulated with just a few keystrokes; once you've waded through the horrendously organized, prepared and written manual.

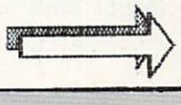
Setup and connection is rather straightforward. Even the units which must be calibrated (like mine), can be up and running quickly. The calibration is no big deal, a sliver of aluminum is supplied to reach into the box for fine tuning; a program on the disk aids you in finding the correct setting. (It will take you longer to read about the adjustment than it will take you to do it).

The vocabularies created with **Voice Master** can be imbedded in your own BASIC or machine language programs though the instructions on how to accomplish this feat leave something to be desired. The additional BASIC commands permit you to alter the playback speed, change sampling rate density (bits per second), manipulate amplitude level, and blank out the screen. All speech data can be cleared (without affecting the application program) with the CLEAR command. Besides the record and playback instructions, the unit's programs provide the wherewithal to save or load files to disk or tape. There is even a turbo load feature, but it doesn't function unless certain hardware parameters are met.

Additional information is provided in the form of memory locations for specific placement of the device's main controlling program. Unless you're really into substantial programming the material will read like so much gobbledygook. Somewhere beneath the convoluted operating system and otherwise twisted means of doing business there appears to be some solid substance to the **Voice Master.** Because of the poor set of instructions you'll spend an inordinate amount of time trying to find nuggets in the stream.

Cutting through all the preliminary nitpicking, let's move on to the acid test, quality of the voice reproduction. Through the supplied headset the playback was tinny and hollow sounding. Figuring the problem was the inexpensive equipment pressed against my temples I ran the audio through my reliable Panasonic. This actually verified the poor reproductive qualities I'd endured before. Though I didn't scientifically measure it, the S/N (signal to noise) ratio was incredibly high. Repeated uses yielded the same results. This device really needs Dolby, B and C by the sound of it!

Summing up the **Covox** entrant I found middle of the road construction (it plugs into the joystick port), woefully inadequate documentation, overcomplicated ways to perform simple tasks, and the worst output of all the devices and software reviewed for this article.



COMPUTER SPEECH

continued...

Yet there's hope for 64 owners yearning for speech recognition. Relief, in this instance, is spelled **R.I.S.T** (Research in Speech Technology). Their **Recognizer** device is as small, if not more so, than **Covox**'s; yet it beats the West Coast entry in every category.

The manual, while it won't win any aesthetic awards, is head and shoulders above **Covox**'s. The information is presented in a logical manner, the flow building on fundamentals before delving into the heart of the issue. The author, Mr. Steven Veltri, even takes the time out to provide a mini-primer on the different approaches to speech recognition. The additional information promotes good will and piques the user's curiosity that much more. (Perhaps he's trying to get you to buy his computer oriented speech books; they're listed in the manual's preface).

Installation and setup is a snap. Speaking into the unit's built in microphone can be a hassle though. Luckily any mike with a one eighth inch male plug fits into the front mounted jack. There's also an RCA jack for external output to a monitor, stereo or TV. Ruggedly constructed of heavy gauge steel, The **Recognizer** appears built to last. Unfortunately there is a contradiction here, a board mounted chip lies at the end of a ribbon cable protruding from the rear casing. This fragile arrangement negates the "tank-like" construction of the main unit. Be careful when handling the card, even if you're not inserting or removing it from the cartridge slot.

Besides the ability to interface with your own BASIC or machine language routines, The **Recognizer** works with canned software like those produced by **Infocom.** Instead of reading the on-screen descriptions as the **Votrax** units do, **RIST**'s device activates the adventure according to vocalized commands. Of course you have to train the vocabulary, a bit difficult to do before knowing all the valid commands in a new adventure. On the other hand, most text adventures have a core of similar commands (take, inventory, directional statements, etc.) so typing time and effort can still be reduced. The supplied disk has a resident **Zork I** vocabulary. All you have to do is train it.

Let's take a detour for a moment. It's possible (with a switch selectable cartridge expansion slot like the **SmartSlot** from **Progressive Peripherals & Software**) to have The **Recognizer** operational, an **Infocom** game loaded, and **Currah**'s **Voice Messenger** working, all at once! This means you can have the **Voice Messenger** read the location settings and descriptions while the **Recognizer** accepts your audio input! **What a way to party!**

Now back to more mundane (?) matters. In addition everything mentioned already, The **Recognizer**'s software enables disk access (save/load), buffering, file linking, and entry creation, erasure, and editing. Though this is an impressive list in its own right, there's even more.

I could probably go on about The **Recognizer** until you were ready to retire so I'll cut it short by simply stating, "Job well done, **RIST**".
Before I wrap this up, there is one thing I promised you, mention of third party software for **Currah's Voice Messenger.** RIST makes a program called **Easy Speech** (formerly **Advanced Text-to-Speech**). It supports adventure games and home made software equally well. Text strings or single words can be entered, edited and saved for future use. **Allophones** are displayed on-screen as characters are typed. With a flick of the wrist the decimal values for the **Allophones** can be displayed, an easy way to produce data statements for your BASIC programs. Though the edit procedure is a little uncommon, a few minutes with the keyboard is all you'll need to become a pro. The program resides in normally untouched memory areas so it can be active even when you're not developing speech synthesis text. It easily accepts text from any source, the serial bus, keyboard, screen, tape deck, disk drive, printer or modem. The modem feature works only if the optional **Talking Terminal Software** program is also loaded. (A copy of this was not supplied so I hadn't the opportunity to review it).

There are other features to be found, some standard, some not so standard. **Easy Speech** is a nicely executed, well documented program; a perfect match for the workhorse **Voice Messenger.**

So, where does all this leave us? For the time being you can add another sensory experience to adventure gaming or to programs born through your own time and toil. In a humanitarian vein you can develop routines beneficial to the blind. The huge installed base of the 64 makes this one of the best applications possible for speech synthesis and recognition.

That's fine for now, but what does the future of this leading edge technology hold for us? Several things, as you're about to learn.

COMPUTER SPEECH
continued...

As the technological barriers crumble under the R & D onslaught there will be low cost speaker independent systems available which understand continuous speech. Already there are at least two, if you're prepared to spend hefty bucks for specialized equipment. With the continual drop in the price of memory, these advances will find their way to the 64 or its descendant(s). **Voice activated typewriters and word processors** are high on the development list. Just imagine how much the market for these products will expand when people with little, no, or poor typing skills can manipulate them easier than current high speed typists can. Well, there goes typing class in every high school across the land! The **military applications** are as endless as they are mind boggling. Probably the only advance beyond vocal input would be direct machine control through a mind link!

There are probably as many uses as there are permutations to every whole number in existence. Only time will tell just what applications the power of computers will bring to this exciting technology. Perhaps you will be the one to design the ultimate breakthrough or suggest the be-all, end-all use.

INFO

BRIAN REDMAN'S
COMPUTER GLOSSARY

TERMINAL ILLNESS

A Bee C'S
Gorf
Magic Voice Speech Module
Magic Desk I
Wizard of Wor

Commodore Business Machines
1200 Wilson Drive
West Chester, PA. 19380

Alien Voice Box
When I'M 64

The Alien Group
27 West 23rd Street
New York, New York 10010

The Personal Speech System
Type N' Talk

Votrax
500 Stephenson Highway
Troy, Michigan 48084

Beyond Castle Wolfenstein
Castle Wolfenstein
Space Taxi

Muse Software
347 N. Charles Street
Baltimore, MD 21201

Chatterbee
S.A.M. (Software Automatic Mouth)

Tronix
8925 South La Cienga Blvd.
Inglewood, CA 90301

The Voice Messenger

Currah Technology
50 Milk Street
15th Floor
Boston, MA 02109

Voice Master

Covox Inc.
675-D Conger Street
Eugene, OR 97402

Easy Speech
The **Recognizer**

R.I.S.T. (Research in Speech Tech.)
P.O. Box 499
Fort Hamilton Parkway
Brooklyn, New York 11209

THREE ASSEMBLERS

by Mark Brown

Assembly language programming can be a very rewarding or a very frustrating experience. The programs you produce using assembly language will be as fast and compact as it is possible for computer programs to be, if you have written them well. On the other hand, assembly language requires an intimate understanding of not only assembly syntax, but of the inner workings of your computer. (see related article last issue.)

Most of your positive or negative feelings about assembly language will come from your experiences with the editor/assembler package you use. Some assemblers are powerful and friendly, and some are almost useless. Of course, most fall somewhere in between. What makes a good assembler? There are three things to look for:

1) The editor should have most of the features of a good word processor for maximum flexibility. The best will allow for free-format input of code with automatic formatting of the output for clarity. It should print to the screen, printer, or as a word-processor compatible file to disk. And, it should allow you to link files together for editing.

2) The assembler should provide for all the standard mnemonics, obviously. But it should also allow imbedded assembler directives, to give you flexibility to assemble to memory or to disk, to link files together, and to perform conditional assemblies (in which some code is only generated depending on certain predefined circumstances). Macro definitions should also be supported. This allows you to define much-used portions of code only once and assemble them by name. The number of labels allowed should be large, and the assembler should be capable of generating relocatable code, so you can reposition your finished program in memory if need be. It would also be nice if a disassembler were included, so you could include previously written machine code in your assembly programs.

3) Last, but not least, the documentation should be thorough and accurate, with an index to help you find facts faast, and examples to get you started. The disk should also contain the manual's examples and a predefined macro library for such things as input and output routines and math functions that you can use in your own programs.

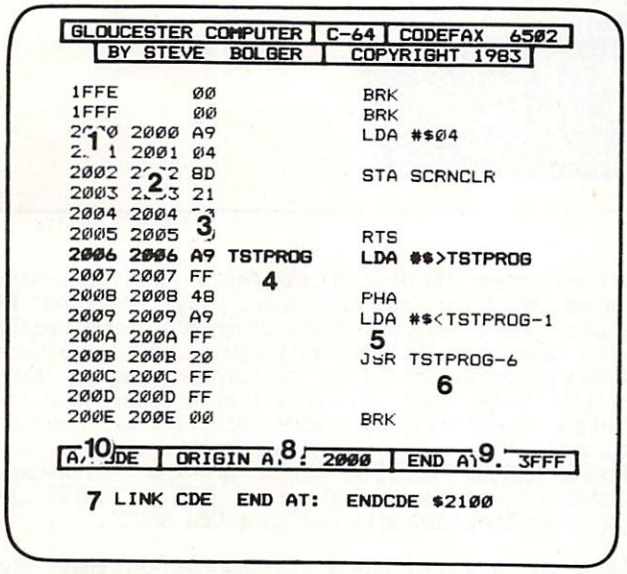
And it would be nice if all of these things existed in memory at once, along with a good monitor program and the DOS wedge, so you wouldn't have to keep swapping programs back and forth. Of course, this ideal system does not exist, so we'll take a look at three popular "real-world" assembler/editors.

Gloucester Computer Company's **Codefax** assembler is the newest of the three we'll look at. It was developed to support the company's **Promqueen** eprom burner, but is also promoted as being more user friendly than traditional assemblers for program development. It's true that the columnar display format makes it easy to see what's going on inside the computer, and the one-line-at-a-time syntax checking could be helpful in learning proper assembler syntax. However, the number of control keystrokes one must learn to control display, data entry, and assembler modes may overwhelm first-time users. The tight affinity between the code entered and workspace memory also makes it difficult to insert modifications, though this can be done by moving code around. There is no support of conditionals or macros or any other advanced assembler functions, either. You can't even include comments! The excellent disk support is one of the few real plusses of this package; even such esoterics as block-reads and executes are supported. In the long run, however, I'm afraid that all **Codefax** turns out to be is a fancy machine code monitor that supports address labels. As a monitor/eprom burner support package **Codefax** may work, but it is not powerful enough to qualify as a true assembler/editor.

Most of your positive or negative feelings about assembly language will come from your experiences with the editor/assembler package you use.

The other two assemblers we'll examine, **Pal** and **MAE**, are tried-and-true veterans. Both have come up to the C64 from various incarnations on the Commodore PET series of computers. Most of the Commodore "old-timers" use one or both of these two assemblers.

THREE ASSEMBLERS



The **Pal** assembler was written by **Brad Templeton** in 1979 and is distributed for all Commodore computers by Canada's **Pro-line Software,** which also markets the **Power** basic utility and the **Wordpro 64** word processor. **Pal** is relocatable and takes up only 4k of memory. It supports free-format entry of code with comments, conditional assembly, and many assembler options. It can link files for assembly and store code in memory or to disk files. It also allows for coresident BASIC and assembly (in the same file!), which allows you to write BASIC programs with callable machine code subroutines. (This is the application where **Pal** outshines all the others: if you are adding machine code to BASIC programs.) The **Supermon** machine code monitor is included on the disk, and the two of them can comfortably co-reside in memory along with the DOS wedge, though the wedge is not supplied. The disk includes a relocating loader also, as well as some sample programs and a disassembler (the disassembler is undocumented, so good luck). The only major feature missing from **Pal** is macro definitions. You will not miss this at first, but later on you might. The editor is the major weakness of **Pal:** it has none! Believe it or not, you have to use the C64's built-in BASIC editor. The best way to comfortably edit a source file is to use **Pal** in conjunction with **Pro-line's Power** support package. This adds word-processor type search and replace features, auto line numbering, and all the other editing amenities you will wish you had otherwise. Unfortunately, this doubles your cost. But together they make a powerful package, and **Power** can be used by itself to make BASIC program entry more tolerable, too. The documentation included with **Pal** is decent, and tells you lots about how **Pal** works. It will not, however, teach the novice how to program in assembly language. Prior knowledge of assembly is assumed. All in all, **Pal** is a very good investment, especially in conjunction with **Power** (they are available together as a package called **Toolbox 64**).

Carl Moser's MAE (macro assembler/editor) is a classic assembler package, and besides being available for all Commodore machines is also marketed for Atari and Apple II. This gives you a degree of source code portability among those machines. The box proclaims "used by more programmers than any other assembler!", which may well be true. **MAE** gives you co-resident DOS support, monitor, editor/assembler, and word processor capabilities, and you can easily jump back and forth from one to another. All are better than the usual comparable packages. The DOS support allows for standard wedge commands plus two-stroke load-and-run, cold-start, and warm-start of all **MAE** modules. The monitor gives you all the basics plus base conversions and offset calculations. (Complaint: the other Commodore versions include trace with breakpoints and single-step capabilities, and I see no reason why the 64 version couldn't have had these features, too.) The word processor has all the standard commands, plus it will justify, allow format shape definitions (print your copy in the shape of a christmas tree, for example), and let you run machine code routines (for things like fancy printer control codes or font downloading) from within the text. The assembler supports macros (hence the name), conditional assembly, and lots of assembly options. Files can be linked for assembly, and source files can be appended for editing. There are many useful sample files on the disk, and a relocating loader is provided. The manual is complete, albeit a bit hard to find your way around in ("getting started" is on page 53!). There is good phone support (evenings only) and a user's group, and updates are only $10 (a 65C02 version is in the works). There is no unassembler, but the user's group has one available (without documentation) on one of many inexpensive support disks. The manual assumes some knowledge, but the **MAE** package is a complete assembly language development system that you will never outgrow.

There are dozens of assemblers on the market, and all of them will allow you to produce executable machine code programs from assembly language. It is the features and ease of use that seperate the really useful packages from the ones that will make you throw up your hands and abandon assembly language before you have given it a fair trial. Make sure the assembler/editor you buy is one you can live with.

Codefax $69.00
Gloucester Computer Co. Inc.
1 Blackburn Ctr.
Gloucester, MA 01930

Pal $49.95 (with **power** as **toolbox** 64 $89.95)
Pro-Line Software
755 the Queensway East, Unit 8
Mississaugua, ON Canada l4y-4c5

MAE $59.95
Eastern House Software
3239 Linda Drive
Winston-Salem, NC 27106

DISK SPEEDUPS

by Mark Brown

With its 300 character per second transfer rate, Commodore's 1541 disk drive is the slowest drive on the market. Even some cassette tape units can beat it in a race. The 1541 is the one real obstacle you encounter when using the Commodore 64 for serious applications. But now there's good news (and some bad news) for disk users who are tired of waiting on their 1541's. Several new products are available which will speed it up.

Because the 1541 operates serially (one bit at a time) instead of in parallel (a byte at a time) like everybody else's disk drive, it will never set any land speed records no matter what you do to it, short of tearing everything apart and wiring together your own parallel disk controller. However, Commodore didn't make full use of the speed available on the serial bus when they designed their disk operating system. They chose, as they often do, to take the cautious approach and allow for slower transfer rates and intensive error checking to assure reliable data acquisition. Their approach, though commendable in theory, really amounts to overkill. The 1541 is still very reliable even with reduced error checking and faster transfer rates. Software can be written to change how the drive goes about these tasks, and this is the approach that 1541 speedup programs take. Note that reduced error-checking means that some heavily copy-protected software, or old and "iffy" disks may have trouble loading, and may not even load at all, when using a disk drive speedup program. The rule is: if it's hard to load normally, it probably won't load fast.

Speedup comes at a cost. Because the 1541 is an intelligent device with its own on-board 6502 processor and DOS in ROM, changes must be made in the disk drive's operating system as well as the computer's. The 1541 has 2k of RAM that is usually used for file buffer area, and some of this must be taken up by new DOS routines. When you use up RAM for a wedge into DOS, you lose buffer space. The 1541 usually has three buffers available, allowing you to have three sequential files open at once, or one sequential and one relative file. But the creation of a new relative file requires all three buffers. This means that if one buffer is occupied by a speedup DOS routine, you will not be able to create relative files (though you should still be able to read them). Some programs, notably database management programs, require the ablility to create and use relative files. That's right: the one application that would benefit most from faster disk access times is the one that can't use a 1541 speedup option. Unless you replace the ROMs in the 1541, **speedups won't work with a database program.**

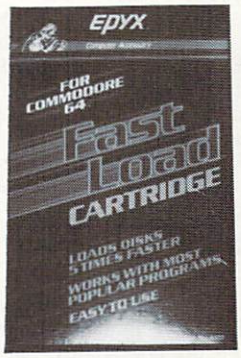
You can't speed up disk access for a cartridge-based program like Calc Result, either. Why? Because **(1)** you can't have two cartridges plugged in and active at the same time, so you can't use a cartridge-based speedup program, and **(2)** a cartridge program takes over the C64 so that you can't load a disk-based 1541 speedup. You can use some disk-loaded speedup programs with a system enhancement cartridge like **Simon's BASIC,** though. Both of the disk-based speedup packages we tested worked just as well with Simon's as they did with resident C64 BASIC.

This might be a good place to emphasise that 1541 speedups generally only affect serial bus access times. All the DOS functions are initiated by giving the drive a command and letting it take over, so newing a disk or scratching a file won't be sped up by a speedup program unless it uploads new DOS function code to the disk drive. Verifying a saved file IS faster, however, because the Commodore 64 uses the same routine for both saving and verifying. Now on to more positive stuff.

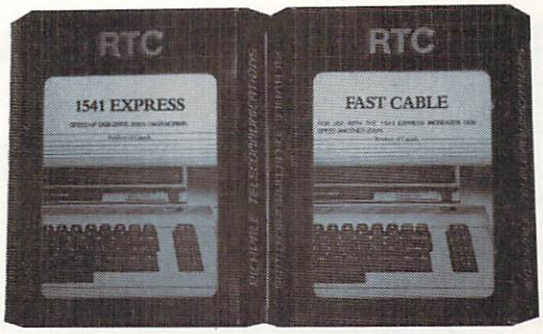
The four 1541 speedup options we'll be looking at are all software solutions, though one has an optional hardware component. Two come on cartridge, and two are disk-loaded. Each approach has its advantages and disadvantages. Cartridges are more expensive, but they are there every time you turn on your computer. They are also less likely to interfere with the software you want to use them with. Disk-loaded versions are cheaper, but must be loaded in every time you power up, and they occupy space in RAM. This uses up some computing power and increases the possibility of interacting and interfering with the programs you hope to be able to run. Actually, since **Compute's Gazette** has now published a fine disk-loaded speedup program that's free with the price of the magazine, the wisdom of purchasing a commercial disk-loaded speedup package becomes questionable. Though I haven't tested it yet, CG claims their **TurboDisk** program speeds up disk accesses by a factor of three. If it's as good as **TurboTape** was, it'll be hard to beat for the price.

Kwik-Load! ($19.95 from Datamost) is currently the best-selling 1541 disk-loaded speedup enhancement. Since the disk is copy protected (and is currently IMPOSSIBLE to back up, by any means known), the first thing you will probably want to do with the **Kwik-Load!** disk is to stick on a write protect label so you don't accidently destroy your twenty-dollar investment. **Kwik-Load!** occupies the Commodore 64's unused upper 4K of RAM, the same memory space the DOS wedge uses. There are actually two versions of **Kwik-Load!** on the disk. The second is compatible with Commodore's DOS wedge, though the wedge is not included on the **Kwik-Load!** disk. Because it resides in RAM, **Kwik-Load!** will not load and run all software. It works well with BASIC programs, but the number of commercial programs it will work with is very limited. For example, it loads Paperclip (in 15 seconds versus 77 seconds normally, which is five times faster), but will not speed up the loading of Easy Script, Suspended, or Doodle! In fact, it crashes when you try to load Doodle! If you try to load a program with **Kwik-Load!** and it doesn't work, there is no way to switch it out and try to load normally without turning the computer off and on to reset it. It doesn't disappear when you use RUN/STOP and RESTORE, either, which can be a positive thing. As a rule of thumb, if a program works with the DOS wedge, it will probably work with **Kwik-Load!**

The **Kwik-Load!** disk also includes a nice utility program called **Kwik-Copy.** **Kwik-Copy** expects **Kwik-Load!** to be in memory and will not run without it. This program is menu-driven and has the capability to copy unprotected disks (full copy, BAM copy, or file copy), edit disk sectors, perform DOS functions, check disk drive speed, and alphabetize a disk directory. There are disk utility programs being sold with less capability for more than the cost of this whole package. **Kwik-Copy** is also the only program tested that affected DOS function times; it will NEW a disk in 10 seconds. Not bad for a bonus program!



Turbo 64 from Final Source Software is a lot like **Kwik-Load!**; it also costs $19.95 and occupies the DOS wedge memory. **Turbo 64** even includes the wedge as an integral part of itself, which is handy. The wedge portion of **Turbo 64** can be disabled with the usual >Q command, but the speedup part can't be shut off. Despite Final Source's claims that **Turbo 64** is superior to **Kwik-Load!**, the benchmark tests we ran on it came out exactly the same. In fact, most of the comments made about **Kwik-Load!** apply directly to **Turbo 64;** their major difference is in philosophy. **Turbo 64** can be copied onto all of your disks so it's always available, but **Kwik-Load!** is copy protected. (Bravo and accolades, Final Source!) There is a handy little bonus program included with **Turbo 64,** too, though it's not as impressive as **Kwik-Copy.** It's called "Bootmaker", and creates an autorun loader for your BASIC or machine code programs.



Both **Turbo 64** and **Kwik-Load!** gain some additional speed by blanking the display screen while loading files. This keeps the VIC II chip from stealing processor time with screen refresh interrupts, saving about 15% additional time. It may also interfere with your sanity since it makes disk accesses as annoying as cassette tape loads (but faster!). **Turbo 64** also keeps the drive activity light from coming on, which can make you wonder if anything is really going on or if the drive motor is just spinning. There's no way to tell until it's done. These are just minor annoyances, though. Either package is worth the price to a BASIC or machine code programmer. Someone who wants to speed up the loading of commercial software should look at the cartridge speedup programs.

Fast Load, recently introduced by Epyx, is a very popular 1541 speedup product. It comes on cartridge and retails for $39.95. It could also be called "Fast Start"; the first thing you notice when you power up **Fast Load** is that initialization of the computer is instantaneous. **Fast Load** is compatible with lots of commercial software. In our tests it loaded Suspended in 20 seconds, as opposed to a 90 second normal load time, or 4.5 times faster. Suspended is a disk-read intensive program, and **Fast Load** made it seem almost as if the adventure's data were stored in memory, not on disk. Doodle! loaded 3.5 times faster and Doodle! pictures loaded in just 7 seconds, not their normal 25. It's very impressive to watch a Doodle! picture slam onto the screen so rapidly. Epyx also lists some of their games that **Fast Load** will work with, such as Impossible Mission and Robots of Dawn. On the other hand, Easy Script was unaffected by **Fast Load;** the Easy Script boot program uses a strange load vector and is unaffected by most speedup packages. Paperclip loaded in just 15 seconds, but disk file access was unaffected, just as it had been with **Turbo 64** and **Kwik-Load!** At least there is an option to kill **Fast Load** from the keyboard if it interferes with proper loading, though you have to power up to restart it again.

The **Fast Load** cartridge also contains three valuable utilities. First is the DOS wedge, which is handy to have in ROM. This version of the wedge has one annoying difficulty, though: you can't pause or halt directory listings. If the directory is long, you may watch helplessly as the entry for the program you want scrolls off the top of the screen. The second feature is a machine code monitor. This is a nice addition, but Epyx, for some strange reason, invented their own commands for the monitor functions rather than following established form. If you are used to Extramon or Supermon you will have to learn a whole new monitor syntax. The third and nicest feature is a complete menu-driven disk utilities package. You can edit disk tracks, perform DOS functions, and copy whole unprotected disks, BAM records, or single files. The full disk copy will backup a whole disk in three passes in about eight minutes, which is not too shabby. Despite its shortcomings, **Fast Load** is probably one of the best enhancements you can buy for your Commodore 64.

This brings us to the **1541 Express** cartridge from Richvale Telecommunications. It has been around for about a year, which makes it the first of the 1541 speedup programs. It's unique in many ways, some bad and some good. Let's go for the bad first and finish on a positive note.

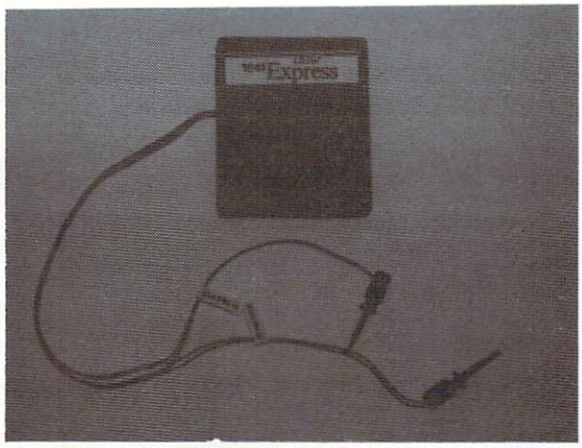
First of all, it costs twice as much as **Fast Load.** Secondly, you don't just plug in the **1541 Express** cartridge. It has a wire with two clip leads that you must attach inside your Commodore 64, which means you have to open the case. I'm sure Richvale lost a lot of potential customers there. It's not a hard job, and the documentation steps you through it well, but you do have to be careful. You also should realize that opening the case voids your warranty. Once it is connected internally and plugged into the cartridge port, it fires up nicely when you power on, and you can unplug it and leave it dangling by its wire when you need to plug in another cartridge. The **1541 Express** speeds up disk loads, but generally only by about half as much as the other products tested.

SPEED COMPARISONS OF 1541 DRIVE SPEEDUP PROGRAMS**

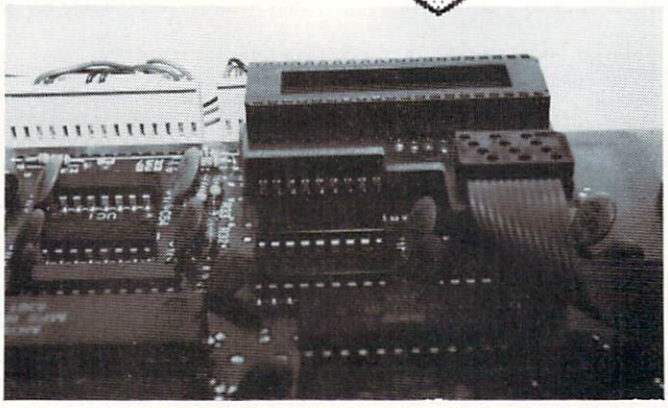
[TIME IN SECONDS] PRODUCT	MONOPOLE* (24.5k) LOAD	SAVE	DOODLE! PICTURE LOAD	SAVE
NORMAL SPEED	75	69	25	27
1541 EXPRESS/CABLE	24	52	9	21
FAST LOAD	24	69	7	27
TURBO 64	24	69	N/A	N/A
KWIK-LOAD!	24	69	N/A	N/A

* MONOPOLE IS JOE O'HARA'S PUBLIC DOMAIN BASIC VERSION OF MONOPOLY. IT OCCUPIES 99 BLOCKS ON DISK.

And as you read the manual you discover some disconcerting restrictions on its use. You cannot have anything else active on the serial bus while you are in fast mode; other disk drives and serial printers must be turned off. If you have a parallel printer hooked up through a serial bus interface, such as the Cardco/+G, you have to unplug the interface to use fast mode! This is so restrictive that I feel the **1541 Express** is unusable by itself if you own any other serial peripherals. To make the **1541 Express** really usable, you have to add Richvale's Fast Cable. This plugs into the user port (bye-bye modem) and attaches (get out the screwdriver again!) internally to the 1541 drive. The Fast Cable essentially makes your 1541 a PARALLEL DRIVE, thus eliminating serial bus interference problems. It should be noted that all disk commands are still sent over the serial bus, and just the data is transferred in parallel. The **1541 Express** cartridge senses whether or not the Fast Cable is present, and makes the proper adjustments automatically. The Fast Cable also brings the **1541 Express** up to about the same speed as the other speedup programs we tested. Once you have everything installed, you have invested four times as much money and much more effort than you would have in any other 1541 speedup device, giving you about the equivalent investment (if you include the price of the 1541) of having purchased a more expensive third-party disk drive. Which is really just about what you've done; you've changed the 1541 enough to almost make it a third-party drive.



Close-up of FAST CABLE installed piggy-back on 1541 circuit board. Cable feeds out thru back.



In our tests, the **1541 Express** with the Fast Cable option was compatible with more software than any of the other packages. It was the only product tested that worked with Easy Script, loading it in 36 seconds vs. the usual 1:06. It also sped up Easy Script file access by a factor of about 3.5:1. Like the others, though, it did not speed up Paperclip access times. Despite the parallel cable, the Express seems to be a few percent slower than the other speedup packages in some situations, though it's still quite fast. It's also able to do some strange things, like allowing sprites to move around and interrupt-driven music to play while reading disk files. It will load Doodle! in 24 seconds, and load a Doodle! picture in nine. Suspended zooms along, too. It still doesn't work in fast mode with a database program, though, because of the DOS buffer it must use. The Express has one extremely nice feature missing from the other speedup programs tested. If you cannot load something in fast mode, a CONTROL / F3 keypress will switch you over to normal load speed. Once you have successfully loaded the problem file, you can switch back to fast mode with a CONTROL / F1. This works even from within programs, unless the program traps the CONTROL keypress. Switching back and forth works fine with Easy Script, Suspended, Doodle!, and most other programs. There is one last bit of good news: the **1541 Express** is the only speedup package tested that also sped up save times. Though not as impressive as the load speedup, the **Express** shaved about 25% off the time needed to save a file. This is definitely a noticible if not spectacular savings. The **1541 Express** with the Fast Cable option is an expensive solution to the slow speed of the 1541 drive. Though it brings the cost of a faster 1541 up near the price of a speedy third-party drive, it has the advantages of retaining full compatibility with all Commodore software, and of being an upgrade product rather than a full investment in a new drive.

Are speedup programs worth the investment? Yes, they are. Even with their limitations, they can remove some of the aggrevation associated with the slow speed of the 1541 drive. The key to success with a speedup program is to find one that will work with the software you want to use it with. Try before you buy!

mach 5

This is a late addition to the cartridge speedups. Similar to FAST-LOAD (for $5 less), MACH 5 also has single-key DOS commands built-in (including "HARD-COPY" and "DISABLE DRIVE RATTLE"). A disk is also included with two programs on it: "DISK ORGANIZER" and "BASIC PLUS 4K" which frees up an additional 4K of BASIC memory.

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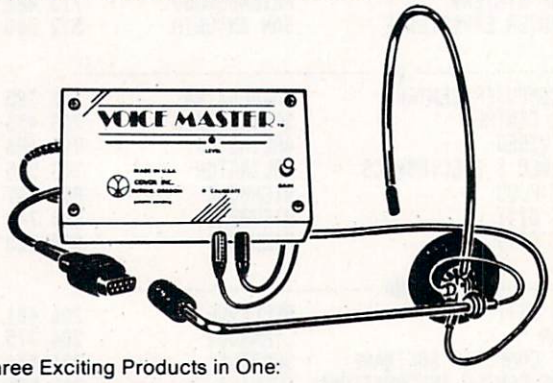

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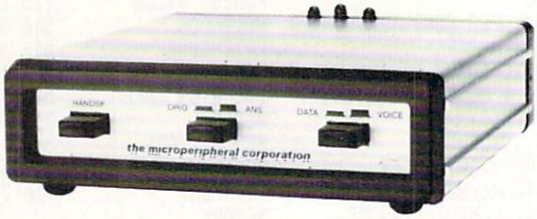

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Be sure to include your name, age, & a phone # where we can reach you. Contest deadline is [illegible]. Winners will be announced in issue #8. Void where prohibited.

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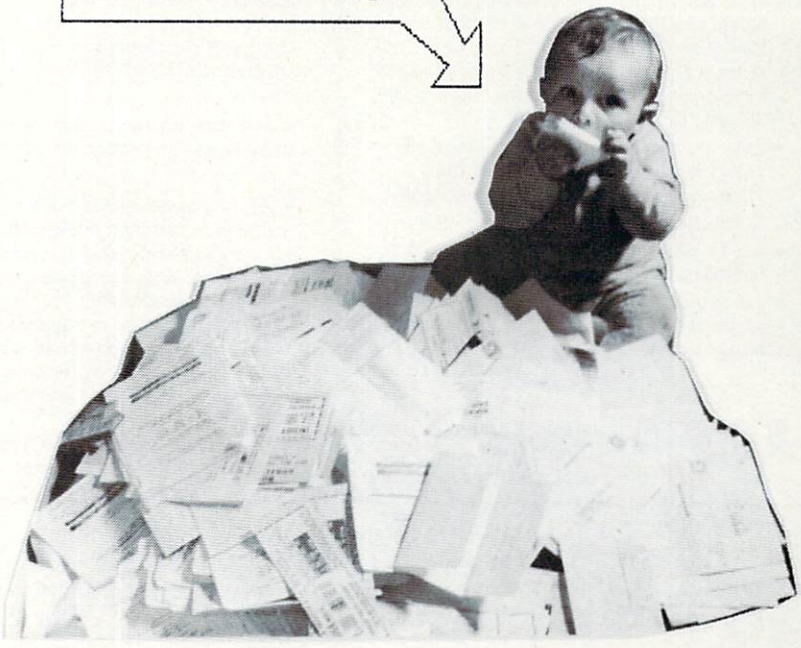

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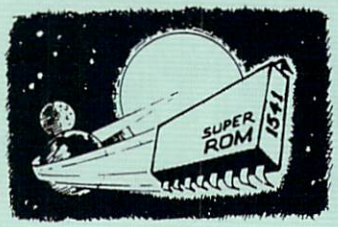

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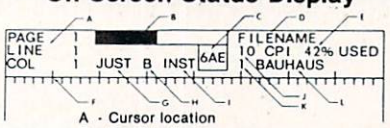

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