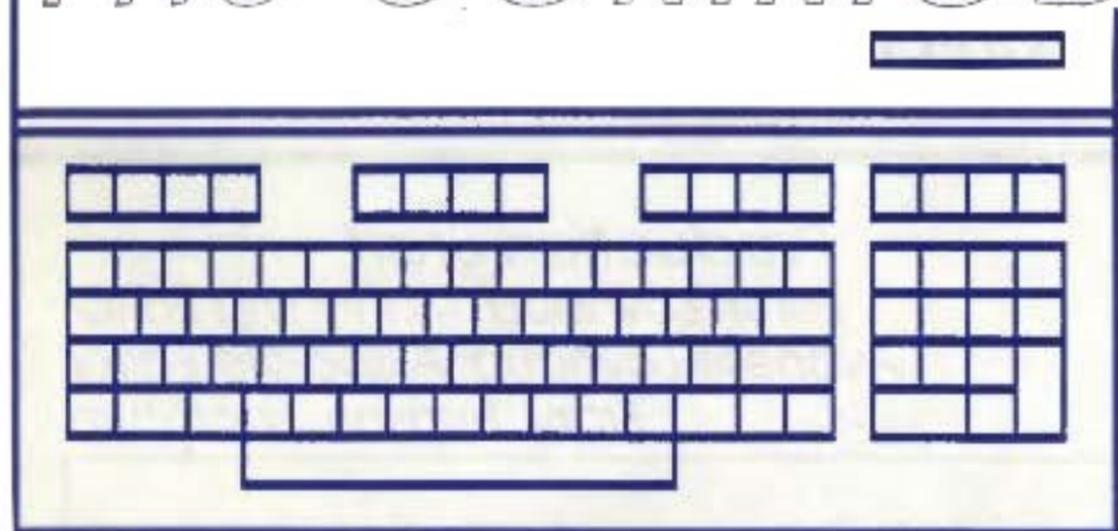


TWIN CITIES 128

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The COMMODORE 128™
Journal



26

C-128
Games
Explosion

Featuring reviews of:
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FUNPAK 128, LOADSTAR 128,
FRACTAL NAVIGATOR,
DIGITALKER 128,
and the BEST
C-128 Public Domain Games

Plus:
Hudson v. Lovhaug,
C-128 Price & Progress Report,
Sparrow's Slick Tips,
Transforming 1541 disks into 1571 disks,
Hacking the 1581 to give your 128 a
720K 5.25 inch drive

Creative
Micro Designs

brings the 128 into
the 1990s by announcing
SCSI HARD DRIVE & RAMLINK
See Our Exclusive Interview

Twin Cities 128: The Commodore 128 Journal

Issue #26

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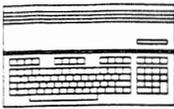
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Twin Cities 128 is published by an overworked staff of renegade microcomputer journalists. Between submitting proposals to Commodore, changing diapers, answering telephone calls and electronic mail, filling orders, writing books, keeping kids out of the refrigerator, taking Boy Scouts on camping trips, creating C-128 PD programs, attending users group meetings, helping local charities, filling pages for RUN, INFO, Loadstar, and Amiga World, and mowing the lawn we publish the best darn publication for 128 owners in the solar system about every other month. We don't smoke, drink, do drugs, take credit cards, or sleep. If you are reading this over someone's shoulder you can stop straining your neck and eyes by ordering your own copies of Twin Cities 128, just write:

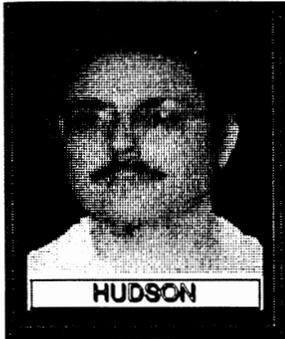
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Hudson vs. Lovhaug Rumor Opinion & Mayhem

HOW MUCH SHOULD C-128 SOFTWARE COST?



HUDSON

In my last "Hudson vs. Lovhaug" essay, I expounded upon my contention that we need more powerful and plentiful C-128 software. I'd like to thank those of you who sent E-mail and plain old regular mail supporting my argument in our first great debate. However, in the service of logical consistency I have to argue a less popular position in this issue: if you want more you are going to have to pay more.

Don't believe me? Ok, take out your disk boxes and look at the stuff in the back. If you're like most of us there are a couple of word processors that would now seem like a stylus and clay tablet to use now, a program or three that promised to be the greatest graphics or newsletter program ever but wasn't even close, and some spreadsheets, databases, and business programs you wouldn't trust with Monopoly money. Hey, they all seemed to be a good deal at the time, but they came out underdeveloped or else they became obsolete with the passage of time.

Look at the front row stuff, or the ones you never even put back into the disk box. Hmm. Wouldn't this one be nice if it supported the 24 pin printers. And this one, if it only had REU support, and that one mouse support, and that one has a stupid bug that drives you crazy even though it's really a useful program, and if I could put this on a 1581 disk it would be so much better, and if it used 80 column mode, and... You get the idea. The first batch represents wasted money at worst and an "educational experience" at best. The second batch represents wasted personal time and underutilized capabilities of our C-128 systems. These hidden costs lead to lower quality results and less pleasure received from our computing adventure. That, in short was the argument last issue. Now why hasn't there been as much progress as I would like? May I suggest it partly has to do with being perceived as offering software producers "less"?

Now I know I've got some of your goats out there with that last statement! I can hear you saying:

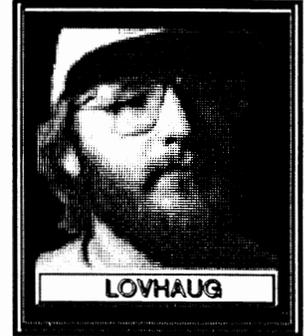
"Just a minute, do you mean to tell me that after I've been ripped-off and underserved by software houses, that in spite of all the money I've sent their way, I haven't given them enough so that they can produce good software?"

Well, yes, despite the fact that all of us at TC-128 consistently take software publishers to task for the faults we find in their programs, there are three reasons why software doesn't keep up with our expectations:

1. Human imperfection, or more crudely put "this program/documentation/feature/printer driver is stupid!"
2. Poor commercial return, as in "What do you expect for \$29.95?" Budgets for low cost software inevitably reflect the expected revenue from the package.
3. A lack of faith in the seriousness of the C-128 user, or "Nobody cares how good it is". I'd like to be able to say that all software houses know the 128 consumer like we do at TC-128, but they don't.

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To use a baseball metaphor that Frank is quite fond of, "Here comes a fat pitch ready to hit out of the park". Come on Frank, C-128 software should cost more? As the old advertising slogan goes, "Why pay more?" In this era of low cost IBM PC clones, one of the biggest advantages 128 owners can still cling to is the low cost of our software. The conventional wisdom in the mainstream microcomputing industry is that consumers should expect to pay at least \$200 for a decent word processor, \$600 for a programmable database, and \$450 for a spreadsheet. Such "wisdom" is what keeps the student to computer ratio in our schools at 30 to 1.



LOVHAUG

In an era when there are more microcomputers than ever, one has to wonder why the laws of macroeconomics have not kicked in to lower the price of computing. After all, the lion's share of costs associated with software production come in a program's development stages, when you are paying programmers to create and test your package and preparing your initial advertising campaign. Once you begin production, your costs are fixed and comparatively low, and benefit from mass production. So why should companies developing software for a personal computer market which is ten times larger than the 128's have to sell their software for ten times as much? The answer is quite simple: because someone is willing to pay for it, or used to be.

Recently a trend towards more economically priced software in the MSDOS world has emerged. Quicksoft and Buttonware, two companies that produce economically priced shareware in the MSDOS world, each grossed over a million dollars last year, selling productivity software on the honor system. Their products, none of which are priced over \$100, are full featured, frequently updated products. The company also has a toll free number for customer support and advertises frequently in the big buck MSDOS computer rags. This revolution in MSDOS software pricing is a direct result of the influx of "real people" (as opposed to fake people, i.e. corporations) into the MSDOS computing world.

Of course, you and I knew better in the first place. We skipped the high prices and bought a computer system in a marketplace where the purchase of quality did not equal the mortgage payment. Now I know Frank is complaining that most of our software does not include extensive support for 24 pin printers and laser printers as well as other peripherals. However, the majority of 128 owners don't own these products. Also, there are packages that actually do support these high cost peripherals. A good example is The Write Stuff 128. Not only is this program full featured and extremely inexpensive, but the program also includes special support for less commonplace items such as HP laser printers, the REUs, and the Quick Brown Box.

Frank also suggests that the low cost software it is not improved as often as more the expensive counterparts from other computer systems. However, my 128 software collection looks a lot like this summer's list of movie

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C-128 PRICE AND PROGRESS REPORT...

by Frank Hudson

Let's Start at Alpha... Cranberry Software Tools has updated their CP/M word processing package Alpha Text Tools. The AlphaSpell spelling checker now has the ability to use and update multiple special purpose dictionaries at one time. They've also added a new utility called the AlphaSpell Assistant. This program allows users to view and correct spelling errors in the context of their document.

Also out is a second font disk for the AlphaFont Printer Enhancer. The disk contains four NLQ fonts, including Slantstyle, Mallow, Scientific and Old English. The AlphaSpell Assistant costs \$7.95 and Font Disk #2 sells for \$12.95. The price of the Alpha Text Tools remains unchanged at \$39.95. *Cranberry Software Tools, Post Office Box 681 Princeton Junction, NJ 08550-0681*

Ooops!... Those of you that read RUN magazine's September issue may have been surprised to hear that the rights to make the 1750 Ram Expansion Unit had been sold to a third party. If you're like me you may have been even more surprised to see how this news was announced, as the REU's sale was referred to by Berkeley Softworks' Brian Dougherty during the course of an interview without further comment from the interviewer or RUN magazine.

As one who has followed Commodore's tenacious defense of its proprietary technology over the years, Dougherty's statement caused me to sit straight up! The logical conclusion was that if this were true, that Commodore would be willing to sell the rights to other scarce peripherals, such as the 1571, and that this was very important news indeed.

Well is it true? Nope. Commodore still retains the rights to the REU design. The very afternoon that we received our copy of RUN we checked with sources within Commodore and at RUN itself, and in both cases they reported that as far as they knew Dougherty's understanding of the REU matter was incorrect. What caused Brian Dougherty to make the claim in the first place? I suspect that the name of SSI's "1750 Clone" (discussed in TC-128 #25) caused his confusion. The "Clone" is of course an official Commodore 1764 REU which SSI buys from Commodore (just as you or I could) and upgrades to full 1750 512K size. As such it is a very useful product for 128 owners.

Speaking of RUN... The just released October issue of RUN features another GEOS 128 first from keyboard of the amazing Bill Coleman. It appears that Bill took a couple of pointers from RUN technical editor Lou Wallace and produced the first 80 column color GEOS application, in the form of an awesome space invaders type game. What we can't figure out is why Berkworks did not incorporate color support in GEOS 128 v2.0 in the first place.

The Strategist.... Strategy Software has announced a new release of The Strategist, a Commodore 128 market timing program for investors in stocks, bonds, mutual funds and commodities. Their press release takes great care to point out that The Strategist is not just another portfolio program, but is instead a full-fledged market tracking system incorporating artificial intelligence and market model testing capabilities. As an example of The Strategist's power its developers point out it can save and analyze 4,896 price quotes at a time. The Strategist costs \$29.95, boasts an 84 page manual, and has a 90 day money-back guarantee. Those wanting to investigate this program's abilities can send \$9.95 to get The Strategist's manual, a cost that Strategy Software will then deduct from the purchase price if you decide to buy the program. *Strategy Software Box 14-2403 Anchorage, Alaska 99514*

Catching up from Issue #25... C-128 paint programs keep coming. Remember last issue when we reviewed two 80 column mode graphics packages? Close readers might have noted that we dropped hints about another hi-res program in development. Well, in this issue we can tell you a bit more. The program's author is Rick Kane (a TC-128 contributor) and it is indeed the first C-128 interlace (640 x 400 pixel) mode drawing tool. The user interface is very impressive, more reminiscent of Amiga programs than the usual 8 bit fare. Rick calls it "I-Paint". As of early September, its development is not quite to beta stage. Decisions as to I-Paint's distribution and retail price have not been made either. We'll keep you posted.

Commodore Magazine's final issue has hit the streets, just as we told you in TC-128 #25, but now we can tell you where they are going to bury the survivors. Subscribers with issues left to receive will be given a choice of RUN or Amiga World to fill out their terms. Former Commodore Editor, Jim Gracely has taken a position with Free Spirit Software, C-128 and GEOS columnist Mark Jordon will be working for the Loadstar 128 disk magazine (see a review of Loadstar 128's first year elsewhere in this issue of TC-128), and his 128 mode column will now appear in RUN.

Answers about 500 C-128 Questions Answered... Work continues here on our new C-128 book, but other pressing issues have caused us to budget less time for 500 C-128 Questions Answered than we had planned. As a consequence, the book is going to come out later than we originally announced. I think you're going to like what we are putting together, and we will get it finished and out to you as soon as we can. Chief among the things that jumbled the book's production schedule was the progress of our proposal to set up a continuing support mechanism for the Commodore 128. I can't as of now reveal the details of Loren's discussions with Commodore, but I will tell you that it has been a very exciting couple of months around the Twin Cities 128 offices. From what we've heard, the letters users like yourself wrote to Commodore have been very effective in getting their attention. Which probably proves a couple of points. One, that TC-128 readers are committed to their favorite computer and can effectively communicate that commitment; and two, that despite the cynics, Commodore listens to what its users are saying, especially if they say it as often as you folks have!

Order and Price Information for products reviewed in issue #26:

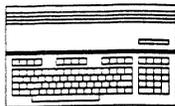
Loadstar 128, Softdisk Publishing, P.O. Box 30008, Shreveport LA 71130, 1-800-831-2694, \$14.95 each

QIX, Taito Corporation, 1-800-663-8067, \$29.95

Wheel & Deal, Free Spirit Software, 58 Noble Street, Kutztown PA, 19530, 1-800-638-5757, \$29.95

FUNPAK 128, RUN Magazine, 80 Elm Street, Peterborough, NH, 03458, 1-800-343-0728, \$19.95

Digitalker 128, Free Spirit Software, 58 Noble Street, Kutztown PA, 19530, 1-800-638-5757, \$19.95



Hudson continued from page 3

Loren will probably say that there is a history of Commodore users refusing to buy more substantial packages at more substantial prices. I'd reply "that is exactly my point". VisaStar is arguably still the most advanced spreadsheet available for the C-128, and it was clearly superior to the competition upon release. Did C-128 users reward this kind of excellence with their patronage? Not a price tag of a bit more than \$100. Bob's Term 128 was far and away the best terminal program available on the 128. It featured better macros, rock-solid reliability, CP/M file compatibility, and a slick buffer editor, but at a street price of \$40-\$50 most users preferred their public domain terms. Ask yourself, if you reward excellence by purchasing mediocrity what message are you sending to sending to the makers of software?

I've lived the low-budget computer users' life and I understand that we all can't have the best or most expensive program around. For myself, I doubt I need a spreadsheet of VisaStar's power, so I'm just as well off with my \$29.95 spreadsheet. But the programs I do need may never see the light of video display because the software industry doesn't believe we 128 owners will return enough money to repay their development costs. Rightly or wrongly, many companies believe that the Commodore 8-bit community is willing to buy only games. From your responses to TC-128 I know many of you want more than that from a computer that is fully capable of delivering more, and we ought to be willing to pay for it.

Do I want to see \$300-\$500 price tags on C-128 packages? You can't pin that on me Loren! Sure there are business packages on the Amiga, MS-DOS and Mac systems that may be worth that kind of change in a business context, but the 128 is not a force in that market. What I'd like to see is more packages in the \$50-\$150 list price range that the rest of the home computer industry is able to support.

Of course, I don't mean that GreedSoft Inc. should just recall all it's \$29.95 packages of Deluxe TurkeyWare just so they can be marked up to \$59.95. In return for the higher price I expect the software producer to provide timely upgrades, support for the 128's hardware options, and perhaps the removal of annoying copy protection. In return, we fork over a bit more dough and continue to forswear piracy. I happen to think that would be a deal many serious 128 users could make.

Lovhaug continued from page 3
sequels. Pocket Writer 2, Planner 2, Filer 2, Geos 128 v2.0, Paperclip III, Superbase 128 v3.0, Jiffy Dos v6.0, The Write Stuff v2.0, and Fleet System IV, prove that our developer community is intent on improving their products.

In a final stroke of irony, the companies in the Commodore developer community who do charge higher prices do not update their products. Vizastar 128 which originally sold for \$120 has not been altered since 1985. Berkeley Softworks has always charged a premium price for their products, while remaining slow to improve many of their most expensive items such as Geopublish. In addition, many of the products they have promised such as Geobasic and Geoprogrammer v2.0 have been shelved as the company takes the profits reaped off the C-128 community and spends them on Apple and MSDOS development. Low cost software and computers, play an important role in spreading the power of computers to the masses. Wishing for higher software prices, plays right into the hands of those merchants who promise and deliver very little. Computer software like all of the other accessories that have accompanied the consumer electronics such as video tape, compact discs, and floppy disks, ought to become more affordable as their popularity and markets increase.



New Release!

Version 6.0

The first in a new series of integrated C64/C128 hardware products from CMD

JiffyDOS™

Give your system a new lease on life and the power to compete with today's newer, more expensive machines

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- **Uses no ports, memory or extra cabling.** The JiffyDOS ROMs upgrade your computer and drive(s) internally for maximum speed and compatibility.
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- **Can be completely switched out.** If ever necessary, the flip of a switch returns you to a 100% stock configuration – without resetting or powering down.
- **Built-in DOS Wedge.** Plus 17 additional commands and convenience features, including file copier, screen dump, directory menu, and single-key load/save/scratch.

C-64 SX-64 systems \$59.95; C-128 C-128D systems \$69.95; Add'l drive ROMs \$29.95
Please specify computer (with serial number) and drive(s) when ordering

System includes ROMs for computer and one drive. User's Manual, illustrated step-by-step installation instructions, 30-day money-back compatibility guarantee and 90-day parts warranty. Add \$4.25 shipping/handling per order, plus \$3.00 for C.O.D., A.P.O., F.P.O., AK, HI, PR & Canada. \$10.00 add'l for other overseas orders. MA residents add 5% sales tax. VISA MC, COD, Check, Money Order. Allow 2 weeks for personal checks. U.G. & Dealer pricing available. Call or write for more information.

• **Version 5.0 owners call for upgrade information and prices** •

JiffyDOS™ Version 6.0

New Features and Enhancements

- **Built-in two drive file copier.** Copy PRG, SEQ, REL and USR files between two drives of any type or to and from REU's. Great for quick backups and moving programs and files between 1541, 1571 & 1581 drives. Directory menu, two-key commands, and Control-key combinations enable easy selection of source and destination drives and the files you want to copy. Can also be used to change filetypes.
- **REU support.** The JiffyDOS commands now fully support Commodore RAM Expansion Units running under RAMDOS. Access your REU just like a disk drive without having to load special wedge utilities.
- **1581 support.** Copy programs and files from 1541 and 1571 drives to any partition on your 1581. Move between partitions easily with just a few keystrokes.
- **Supports CMD HD Series Hard Drives and RAMLink.** Enhances the performance of CMD's new line of integrated C64/C128 products.
- **Quick printer output toggle.** A simple 3-key command switches output from screen to printer and back with ease. Eliminates the bother of having to type the complicated OPEN4,4:CMD4 and PRINT#4:CLOSE4 command sequences.
- **Redefinable 64-mode function keys.** If the JiffyDOS function keys are not to your liking, you can easily redefine them to suit your specific needs.
- **Enhanced screen dump.** Automatic screen mode recognition and printing of uppercase/graphics & lowercase characters.
- **Adjustable sector interleave.** Enables you to increase disk-access performance even with hard-to-speedup software.

AN INTERVIEW WITH: CREATIVE MICRO DESIGNS

...The folks who brought you JiffyDOS are planning some very interesting new hardware

At Twin Cities 128 we have always made a concerted effort to bring our readers the latest news concerning Commodore 128 developments. This commitment to getting important C-128 information to you has resulted in our having the first and most detailed coverage of such important developments as the Commodore 128 and 1571 upgrade ROMS, GEOS 128, the 1581 disk drive, BASIC 8, and C-128 Mega-Hires interlace video. This issue continues our tradition of getting the news out to you first with the interview that begins on the right.

On September 8, 1989 I interviewed Charlie Christianson, Mark Fellows and Charlie Andrews of Creative Micro Designs. Creative Micro Designs, Inc. is best known as the developer of Jiffy Dos, a product which significantly enhances the performance of Commodore floppy disk drives while maintaining a high degree of software compatibility. In fact, Creative Micro Designs, Inc. has literally grown up around the development of Jiffy Dos. During the summer of 1986, Mark Fellows started out with the intention of creating a MIDI sequencer on his C-64 for a band he was a member of. As he worked on this project he became frustrated with the limitations imposed on him as a result of slow floppy disk access. After spending a great deal of time researching the inner workings of Commodore DOS, Mark developed a solution. At first this early version of Jiffy Dos was only Mark's own private development tool. Mark continued his work on his sequencer until someone from his local Commodore users group saw Jiffy Dos in action and insisted that Mark implement his solution in his computer as well.

Shortly thereafter, Mark shelved the MIDI sequencer project, opened a company called Fellows, Inc. and began to advertise Jiffy Dos with a small classified ad in Computer Shopper. Jiffy Dos was well received and sales began to escalate to the point where Mark alone could not sustain Fellows Inc. while continuing his day job as a technical writer for Gerber Scientific. So Mark approached Charlie Christianson to assist him at Fellows, Inc. Both Mark and Charlie began working nights in Mark's basement assembling and refining Jiffy Dos. Sales continued to increase and it became apparent that Mark and Charlie were going to have to expand their operation again in order to keep up. In order to sustain their expansion, they enlisted the help of Charlie's father as an investor. He allowed Mark and Charlie to install a phone at his office where Charlie worked and a new corporation, Creative Micro Designs, was formed to take over the operations of Fellows Inc. Since that time, Creative Micro Designs has evolved into a major player in the Commodore eight bit microcomputer industry. Their Jiffy Dos product is recognized throughout the industry as the best disk drive speed up and enhancement product for the 64 and 128. And now they are preparing to release three new products for the 64 and 128 which have the potential to drastically change the way we use our computers!

JIFFY DOS v6.0

Loren: I want to begin with a few questions about Jiffy Dos 6.0. First, what new enhancements are incorporated in Jiffy Dos 6.0?

Charlie C: The new version of Jiffy Dos adds a number of new features to what is regarded as the best disk drive speed enhancement system available for the Commodore 64 and 128. These features include: a built-in file copier with REU support, redefinable function keys in 64 mode, user definable sector interleave to maximize disk performance, a printer/screen output toggle, and an enhanced screen dump feature which supports both uppercase/graphics character set as well as the lowercase character set.

Loren: Is this upgrade to both the Jiffy Dos kernal as well as the Jiffy Dos drive ROMs?

Charlie C: No. Jiffy Dos v6.0 is an upgrade to the Jiffy Dos kernal only. The drive ROMs have not been changed.

Loren: Does the built in file copier support the REU as well?

Mark: Yes it does.

Loren: Could you elaborate on the Ram Expansion support incorporated within Jiffy Dos 6.0?

Mark: Basically, with the earlier versions of Jiffy Dos (versions 5.0 and before) only serial bus drives were supported. With 6.0 we changed the code so that the calls to the serial bus which open or close files for instance are available to the REU with RAMDOS. So this means that all Jiffy Dos commands can now be used in conjunction with the REU.

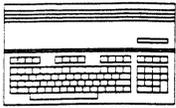
Charlie C.: One point I'd like to interject: one of the great uses of the file copier is the transfer of data between the 1541, 1571, and 1581 drives, as well as the REU. One of the great dilemmas in the Commodore world right now is how do I get files across different disk formats.

Loren: Are you planning any future releases of Jiffy Dos, and is this version the one incorporated in the new products we are about to discuss?

Mark: No future releases of Jiffy Dos are anticipated at this time, and this is the version we will be using with all of our new products.

Loren: Are there any speed improvements with this new version of Jiffy Dos 6.0?

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Mark: There are no direct speed improvements, however through the use of the adjustable interleave option one could boost the speed of programs that were not enhanced by Jiffy Dos.

HD SERIES HARD DRIVE

Loren: Why do you think that so few individuals and/or companies have attempted to market hard drives for the Commodore 64 and 128?

Charlie C.: I think it is because people perceive the market for large mass storage devices as being a lot smaller than it is in the MSDOS and Macintosh worlds. Companies have neglected this market niche because they simply did not understand that many people would like to attach hard drives to their 64s or 128s.

Charlie A.: I think that there may be more to it than that, the development of a hard drive system for use with Commodore home computers is an extremely complicated problem. It is not simply a hardware problem. In addition to needing to have a fundamental understanding of all the hard disk technology that is involved, it takes someone with an intimate understanding of Commodore's system software in order to develop the intelligent interface. We have spent a great deal of time and effort exploring the inner workings of Commodore DOS and developing ways to improve it. Through the process of developing and enhancing Jiffy DOS, we have acquired the experience that is needed in order to create a fully integrated hard drive solution.

Loren: Let's discuss your solution, namely, the HD series hard drive you are about to introduce. To begin, I'd like to talk about the speed of the drive. I understand that it is going to be interfaced via the serial port, in its default configuration. Can you describe the speed of the hard drive in comparison to the floppy disk drives Commodore 64 and 128 owners currently use?

Mark: At this point, we have not finalized the operating system, so I can't tell you exactly what the data transfer rate will be in actual kilobytes per second. When it is used on a stock 64 or 128, interfaced via serial bus, without the benefit of the Jiffy Dos Kernal present in the computer, it should be as fast or faster than the 1581. And that's in all operations, reading and writing. If the computer is equipped with a Jiffy Dos Kernal, then the hard drive will be as fast or faster than a 1581 which is equipped with Jiffy Dos. This is particularly important in 64 mode where you don't have the benefits of the 128's fast serial mode.

Loren: On the 128, is it fast serial compatible?

Mark: Yes it is.

Loren: I understand there will also be a parallel interface option. How much faster will the HD Series hard drive be when used with this option?

Mark: We are estimating, and this is something that isn't finalized either, that it will be 2 to 3 times faster than even the Jiffy Dos aided serial bus option, although it will depend on what software you use. The faster you go, the more dependent you are on how well the software is written; if the software is accessing things slowly, then no matter how fast your data transfer rate is, you are still not going to be able to speed things up as much as you would like.

Loren: Let's talk a little bit about compatibility. How compatible will the hard drives be with existing software?

Charlie A.: Compatibility is one of the reasons why we opted to go the serial bus interface route. Basically, because we maintain the serial bus connection, any software which is compatible with Jiffy Dos (which is the basis for our operating system), should be compatible with the hard drive.

Mark: That is probably the best way to describe it. Of course, until the final operating system is complete, this is speculation but it is certainly our goal.

Loren: Will the parallel option severely compromise compatibility?

Mark: It shouldn't because it is not just a parallel connection. The parallel connection on the drive will be interfaced via our other new product called RAMLINK. Because of the way RAMLINK works, we should be able to achieve the same level of compatibility that we get with the serial interface option. RAMLINK automatically intercepts serial calls in a way that has not been done before and that's really what is going to make the parallel option as compatible as the serial option.

Loren: What about CP/M compatibility for 128 owners?

Mark: We are shooting for CP/M compatibility with the initial release in the form of separate CP/M partitions on the hard drive that can be accessed once CP/M is booted.

Loren: Will you be providing some kind of hard drive backup and maintenance software with your hard drive?

Mark: Of course we are going to have to provide some utilities with the drive such as a low level format utility, and a partition creation utility. In addition the drive will be pre-formatted and ready to use when the user receives it. File copying with wild cards is supported within the operating system. In the future we also anticipate releasing a number of enhanced utilities. I also should mention that with the Jiffy Dos kernal installed you will have the use of its built-in file copier as well.

Loren: How well will disk based copy protection fare with your hard drive? Do you anticipate the need for deprotection utilities such as the Icepick utility included with the Lt. Kernal?

Mark: Basically any program that is compatible with Jiffy Dos should have no problem working with the hard drive, that is, any programs that address the serial bus via standard Commodore Dos. In the case of popular programs which communicate with drives using special means, we are anxious to work with developers in order to provide support for their products with our hard disk system. We also are striving to create basic support for GEOS within our operating system itself.

Loren: Let me ask you about your DOS. Are you providing support for partitions and subdirectories? In addition, are there limitations to the number of files per subdirectories, or number of subdirectories per directory, etc.?

Mark: There should be no limit on the number of files, at least that is how it is planned. It is only limited by the amount of storage space on your drive. There is a limit on the partition size, namely the largest possible partition size is 16 MB. Within each partition we will support subdirectories, similar to those implemented under MSDOS. The user will be able to specify complete paths within DOS commands, unlike the 1581's DOS where you have to specify one step within your partition at a time. However, in spite of the incorporation of these improvements we will be fully compatible with Commodore DOS.

Loren: One feature that is quite helpful in the context of hard disks is time and date stamping. Will your DOS incorporate support for this and will you have some sort of real time clock incorporated within the hard drive chassis?

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Charlie A: We have not yet decided whether a clock will be a standard or whether it will be an option which users can purchase, probably for under \$40. Regardless of whether it comes with the drive or as an option, there will be time and date stamping support incorporated within the hard drive's operating system.

Loren: Is there a minimum partition size?

Mark: Hmm...I have not really given that much thought. I suppose the limit would be one Commodore disk block plus the partition overhead, which is approximately 8K.

Loren: Have you tested the drive with Commodore DOS's relative and random access file formats?

Mark: We have not done extensive testing at this point along those lines. The relative file structure is similar to that which is used in the 1581's DOS which greatly expands the capacity of relative files.

Loren: Okay, guys it is time to ask the tough question. How much is it going to cost?

Charlie C: We are shooting for an initial introductory price of under \$600 for the 20 megabyte unit. We also will have available larger units for bulletin board operators or anyone else who might have the need for a larger drive. I also want to stress that because our unit is SCSI compatible, it won't be obsolete should you decide to buy a new computer system. Just cable the drive to the SCSI hard drive controller on the new computer and reformat the drive with that computer's system software and you are off and running. This makes our hard disk a safer investment as microcomputer technology continues to evolve.

Loren: Will you be able to chain multiple hard drives to your unit, and will there be any support for sharing your hard drive between multiple Commodore computers or between a Commodore computer and other machines, perhaps via a SCSI network?

Charlie A: Because of the nature of the SCSI standard you will be able to chain up to seven additional SCSI compatible devices to our drive via our standard SCSI out connector. As for sharing drives between multiple hosts we have not incorporated support for that, and because of the differences between Commodore and non-Commodore operating systems I don't envision ever being able to share a drive between Commodore and non-Commodore hosts.

RAMLINK

Loren: Earlier you spoke of Ramlink and some of its capabilities when utilized with your hard disk, would you please tell us more about Ramlink?

Charlie C: Ramlink is a multi-purpose interface which plugs into your cartridge port designed to greatly enhance the performance of Commodore's RAM Expansion units. In addition in the context of our hard drive system it provides the faster parallel connection we spoke of earlier. When used with an REU it can provide power to the REU to sustain data files which are stored within expansion RAM when the computer is turned off. There is also a pass-thru port which allows for a second peripheral to be connected to the cartridge port in addition to an REU. Ramlink also provides its own version of RAMDOS which allows the REU to be viewed by Commodore DOS as a serial bus drive, much as Commodore's own RAMDOS does, but in a way which is faster and far more compatible with commercial software. In addition, many of the features supported within our hard disk operating system will be available for use with RAMdisks such as subdirectory support for instance. Also, the Jiffy Dos 6.0 kernal is incorporated within Ramlink so any computer you attach Ramlink to automatically get the benefits of the Jiffy Dos kernal without having to actually open up the computer and install it.

Loren: Wow! Tell me about your version of RAMDOS, specifically how much faster is it, why it is more compatible with commercial software and how you achieved this.

Mark: Well as you may have observed from using Commodore's RAMDOS, there are times when it is lightning quick, such as when you are loading and saving programs to the REU, however at other times, specifically when you are accessing data files byte by byte, Commodore's RAMDOS is as slow as a 1581. This is because Commodore's RAMDOS swaps itself in and out of the computer each time the computer does a read or write of an individual byte in a sequential, relative, or program file. Our RAMDOS circumvents this problem in a manner which is proprietary, however the result is that data read and writes are ten to twenty times as fast as the 1581 depending on your program. This is essentially what you would expect from a RAM based storage device. In addition, as you are probably aware, RAMDOS does not support many direct access commands, such as the block read and write commands and the M-R and M-W commands, which our RAMDOS does. This gives our RAMDOS far more compatibility with many programs.

Loren: Will your RAMDOS support the extended DOS commands and functions provided within Commodore DOS 3.0 in the 1581?

Mark: In some respects. The RAMDOS in Ramlink and our hard disk operating system are very similar. The only major difference is that in the case of the hard drive we are talking to a hard disk controller and in the case of the REU we are talking to a memory management unit, in either case from a user's perspective these peripherals will act as a standard floppy disk unit, with the exception of substantially increased performance.

Loren: What you are saying is that the REU and the hard drive in its parallel configuration simply act as peripherals attached to Ramlink. Are you considering any other peripherals that could be attached to RAM link such as additional RAM cards?

Mark: Yes, it is correct to look at Ramlink as an interface for peripherals, including extra RAM Expansion above and beyond the capacity of the REUs.

Charlie A: I think it is important to stress at this point that the hard drive and Ramlink are mutually exclusive in that they are designed to function independently of each other. However when they are used in conjunction with each other, even greater performance and potential is achieved.

Loren: What kind of price are we talking about for Ramlink?

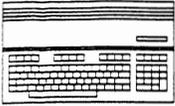
Charlie C: I think it is safe to say between \$59.95 and \$99.95.

Charlie A: There are a number of exciting options we are going to be able to give C-64 and C-128 owners via Ramlink, the reason for the range in the price that Charlie just quoted you is because at this time we are considering offering Ramlink in a number of different configurations at different prices, including the inclusion of the RAM expansion capability we just spoke of.

Loren: Tell me a little more about the extra RAM expansion potential of Ramlink?

Charlie C: We are building the capacity within Ramlink to add in additional RAM cards designed and marketed by CMD. The exact size of our RAM expansion cards and their configuration is still under development.

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Charlie A: I can say that our minimum expansion capacity could be as low as an additional 256K or as high as an extra megabyte and beyond. We believe eventually we may be able to provide as much as four megabytes of additional RAM expansion if there is demand for such a product. However at this point it is important to note that we have not made any firm decisions about our RAM card configurations.

Loren: Will the additional RAM be user installable?

Mark: Yes, that is our goal. That way someone could buy a Ramlink with RAM Expansion capability and add more RAM as their needs and wallets dictate.

Loren: Let me clarify this for our readers, you will be offering Ramlink in more than one configuration. For instance, there will be a version of Ramlink that has memory expansion, and perhaps a lower cost unit that does not. If this is the case will there be the ability to upgrade the lower cost option to the performance and expandibility of the enhanced options?

Charlie C: Yes that is correct. I want to stress that all versions of Ramlink will give you the ability to connect both the 17xx series REUs from Commodore as well as any additional RAM expansion cards/modules that CMD markets. No matter what version of Ramlink you purchase there will always be a complete upgrade path, however it may be cheaper for the user in the long run if he or she purchases the Ramlink with one of RAM cards or with the hard drive in a bundle.

Loren: Let's talk a little bit about Ramlink compatibility with existing software. Essentially there are three classes of Commodore software as far as REU compatibility is concerned, these classes are: 1. Software which is compatible with Commodore's RAMDOS, 2. Software which provides its own custom REU support such as Paperclip III, The Pocket Series, and GEOS. and 3. Software which cannot be used with the REU at this time. How are you achieving compatibility with these different software classes?

Mark: Our RAMDOS software treats the REU as well as any additional RAM added to Ramlink via our RAM cards as if it were a serial device. This

means that it will function with most programs as if it were simply another drive on the serial bus. This means that those programs which function with Commodore's RAMDOS will perform with our RAMDOS. In addition most programs which use standard Commodore DOS calls should not have a problem with our software, even those which do not function with Commodore's RAMDOS. In the case of programs which include their own custom REU support, we will have a disable switch for our RAMDOS so conflicts between the program's REU support and ours can be avoided. However, in many cases these programs also will function with our RAMDOS just as any other disk drive would so if you have the option to disable the program's REU support you might opt to do so in order to make use Ramlink's features, such as continuous power and extra RAM.

Loren: Let's suppose that I am a Jiffy DOS owner right now, and after reading this issue of Twin Cities 128, I find myself very interested in the upgrade to Jiffy DOS and the Ramlink. Since Jiffy DOS v6.0 is essentially incorporated within both of these products, which product should I buy and when, and does the purchase of Ramlink make my initial Jiffy DOS purchase obsolete?

Charlie C: Here is my advice: If you like Jiffy Dos, and you are not sure whether or not you are interested in Ramlink, I would order the upgrade to Jiffy DOS now. Jiffy DOS 6.0 is available now and the extra utilities will make it well worth the upgrade price, especially for people who own REUs and more than one drive type (i.e. a 1571 and a 1581). If you are interested in Ramlink you may want to wait as the Jiffy DOS v6.0 kernal ROM is incorporated within Ramlink. You

will still need Jiffy Dos ROMs for the drives that you want to be enhanced with Jiffy Dos.

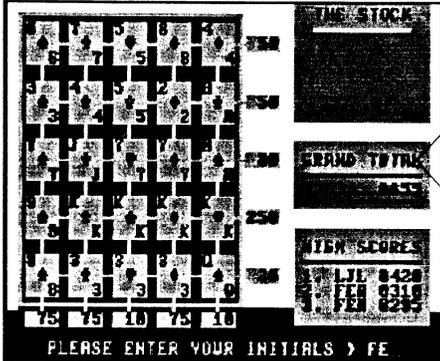
Charlie A: I agree with Charlie's advice for the most part. However I want to point out that there may be a number of times, especially for the owners of multiple computers where you might want to have the Jiffy Dos kernal installed within your machine as well as within Ramlink. For instance, let us suppose that you own a C-64 and a C-128 and purchase a Ramlink and a hard drive from us. There will be times when you will want to use your Ramlink and your hard drive in conjunction with one another to give you the greatest possible performance. However there may be other times when you will want to use the hard drive on one computer and the Ramlink on the other. In this case, you would want to have the Jiffy DOS kernal inside of the computer that you have the hard drive connected to since the speed of the hard drive is greatly increased when used in conjunction with the Jiffy DOS kernal. In addition, if for some reason you need to disable Ramlink you will lose the benefits of Jiffy Dos if you do not have it installed within the computer.

Loren: And now my final question: When can we expect to see these products?

Charlie C: Jiffy Dos v6.0 is shipping now. We will be showing prototypes of the HD series hard drive and Ramlink at the World of Commodore show in Valley Forge, September 22-24, 1989. It is our hope that the hard drive will be completed and certified by the FCC before the end of the year with Ramlink following shortly thereafter. We may even be able to sell drives at the World of Commodore show in Toronto during the first week in December.

***Sparrow's Slick Tip:
Jiffy Dos upgraders: return your
old Jiffy Dos Kernal ROM and
save on your upgrade to
version 6.0. Call Creative Micro
Designs for details.***

One Year Of: LOADSTAR 128



Can Frank top Loren's high score in Loadstar 128's Draw Poker?

by Frank Hudson

For several years now Softdisk Inc. has published a disk magazine called Loadstar for the Commodore market combining text files, programs, and programming tips. Each Loadstar issue included a C-128 section directed at our favorite machine, leaving the consumer with the eternal question: "Should I buy the whole thing, when all I want is the 128 portion?"

Last year Softdisk rephrased the question by starting up a quarterly C-128 version of Loadstar. Consisting entirely of 128 related files, Loadstar 128 has now published four issues. That's a lot of territory to cover in a short review, but I've looked briefly at everything Loadstar offered on the first four disks, and here is what I found.

Computer expertise is not needed to access any of the magazines features. Loadstar 128, like most computer disk magazines, has a simple to use menu interface that loads programs or their instruction files as well as articles stored on disk as text files. With the exception of one file (Quarktoy, issue #4), every file ran and seemed to operate as advertized on my flat 128 and single 1571 system. Switches between 40 and 80 column screen modes were clearly indicated and sensibly implemented by the Loadstar interface. Loadstar is issued on 1541 format floppy disks, but the user is clearly prompted when to reinsert the disk's reverse side. While floppies are annoying, it does allow the owners of 128/1541 systems to use Loadstar, and the files may be copied over to a 1571 format disk for easier access.

What kind of stuff is found in a representative Loadstar 128? Judging by the first year's output, you will probably find a programming demonstration, a 40 column game or two, a text adventure, and couple of utilities or home productivity programs. While the text files are occasionally illuminating, they didn't make me miss a "real" paper magazine. Loadstar plans to add more text files written by 128 experts in the near future, but for now at least, the value of Loadstar 128 is dependent on the average of eight programs included in each issue.

How good are these programs? For the most part they are equal to the best public domain offerings, and even the weakest of Loadstar's first year programs equals the quality of the average communications service download. Speaking specifically of games (after all this is the Games Issue), most of the games I played were 40 column mode with an emphasis on strategy and cleverness instead of rapid joystick manipulation. At \$14.95 an issue (or \$39.95 for a 4 issue quarterly subscription) the cost is

also competitive with downloading from Qlink or GENie, especially if your interests lie along the line of the maze/hit points/spells sort of adventure games or solitaire card games. The first year of Loadstar published good examples of each (Slot Poker on issue #2 and Epic on issue #3). I'd like to see more use of 80 column mode here, and no game so far published by Loadstar 128 is up to the standards of the top 64 mode commercial titles. Learning BASIC programmers should be exceptionally interested in Loadstar's fare, as most programs are in listable BASIC. Along with the programming topic demonstrations, studying other people's code is one of the best ways to learn. Offerings during the first year of Loadstar include an excellent demo of 128 80 column screen tricks (issue #3), an 80 column font editor (issue #3), and a SID sound designer (issue #2).

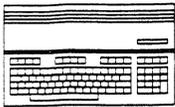
On the utilities and business programs end, Loadstar's offerings are usually solid and full featured, but nothing offered in the first four issues breaks any new ground. New owners of 128's might appreciate things like a loan amortization program or a calendar/memo program, but most veterans will already have one. Even though the topics are hardly new, Loadstar's gradebook program (Grade*Star, issue #2) and Measurement conversion/estimator program (1989 Convertible, issue #3) are better than any other similar programs I've seen. Although they are available elsewhere, Loadstar 128 has distributed Kevin Hisel's excellent disk doctor (issue #4) and file maintenance/copier program (Disk Whiz, issue #2).

Do I recommend Loadstar 128? That depends on what kind of user you are. Beginning to intermediate BASIC programmers will get enough educational benefits from Loadstar to justify the modest cost. If the future issues of Loadstar follow past form, games devotees will split, with action-oriented "kill the sprites" players finding little to their liking, but the adventure and strategy fans looking for bargains will probably be happy with the offerings. Loadstar 128's value to business and utility program users is hardest to gauge. However, if you are still searching for a program to accomplish some particular task, and Loadstar 128 has a selection in that area, their solution is probably worth looking at.

GRADE*STAR Quiz - The Brain --- Value: 85 Pivotal Gradebook

Student	Pct	100	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Borten Linda	93	657	81	A	140	17	8	23	B	12	B	10	B	10	23	13	13
2 Canawaker James	86	607	83	B+	138	19	8	24	B	9	B	10	4	F	28	2	2
3 Casey Benjamin	84	596	79	C	125	16	++	21	B	7	C	23	4	F	21	3	4
4 Conovan Tess	76	525	74	C	114	17	S	20	B	7	C	23	15	F	24	4	4
5 Edwards Edie	78	553	26	B-	106	18	0	25	A	11	A	13	13	B-	24	5	5
6 Fujihara Eli	84	595	82	A+	143	20	13	23	A	7	F	15	13	B	25	7	7
7 Griswold Gary	81	578	75	B	123	13	F	23	A	7	F	13	13	B-	21	7	7
8 Holiday Bartholow	85	565	82	C	126	06	0E	0E	B	11	B+	14	C+	20	8	8	8
9 Jeskyl Henry	86	486	77	B-	115	15	15	25	A	11	B	12	C	23	9	9	9
10 Kildane Richard	83	585	68	A-	128	18	A-	25	B	11	B	16	B	10	10	10	10
11 Lawson Stanley	75	531	73	C	101	19	B+	24	B	6	S	9	F	23	12	12	12
12 Ogilthorpe Nizzie	84	551	81	B	98	18	C	18	A	7	F	13	B	26	12	12	12
13 Richards Patricia	93	633	88	B+	143	17	B	19	A	11	B	13	B	10	13	13	13
14 Royce Renee	98	619	82	A-	143	17	B+	21	B	5	C	29	B	21	14	14	14
15 Royce Richard	85	577	79	B	138	17	C	20	C	11	B	15	B	15	15	15	15
16 Poylott Grimesby	93	470	69	C-	08	16	B	28	B	11	A	19	C	25	15	15	15
17 Santee Jorge	83	563	84	B	140	19	B	21	A	9	F	17	B-	21	17	17	17
18 Slivka Donna	86	605	85	B	131	18	C-	24	B	4	B	15	B	24	18	18	18
19 Thompson Theodore	92	551	78	B	148	20	C	21	A	11	B	18	B	25	14	14	14
20 Watson John	93	659	82	A+	142	18	B	26	C	9	B-	12	B+	23	20	20	20

A plenty nifty gradebook program from Loadstar 128 issue #2. Loadstar's own grade depends on what you are looking for in C-128 programs.



QIX FOR THE 128

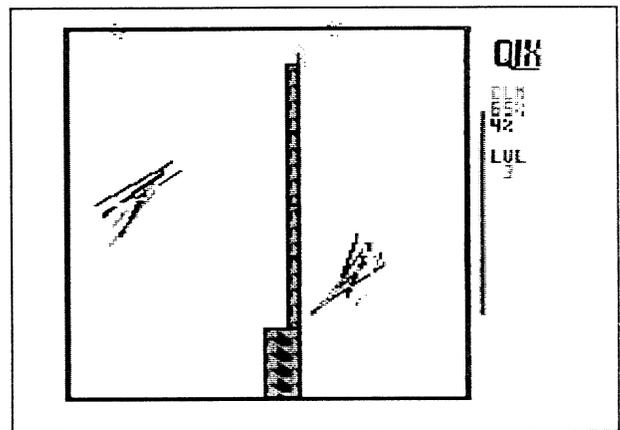
review by Loren Lovhaug

In the Apple and IBM worlds it is not unusual for the producers of entertainment software to incorporate support for a number of different hardware configurations within their release. Often this means actually incorporating more than one version of the program on a disk. In the Apple world for instance, you will find that many game disks have separate versions for the older 64K Apple IIs as well as the more modern 128K Apple IIs. In the IBM world, most game manufacturers include separate versions of their product for use with many of the popular video controllers occupying slots within the sea of clones.

However, for some strange reason only a few software companies in the Commodore world have opted to create enhanced C-128 versions of their C-64 games to be placed on their products distribution disk. Two issues ago, we told you that Sir-tech, makers of the Wizardry series of adventure games had added C-128 support to their packages, and now another major C-64 game producer has joined the C-128 support ranks. Taito software has incorporated C-128 support in their just released version of the arcade classic, QIX.

Qix is a unique game in that even though it originally appeared in the arcades during the era of Pacman and Space Invaders, it totally avoided the well worn "kill the sprites" theme. Qix combines the territorial acquisition strategy of a war game with classic arcade action as you box off areas of the screen while avoiding various moving meanies. Your goal is to box off at least 65% or more of the screen. The more area you claim, the higher your bonus score is. As the game progresses you dodge more and faster meanies and the area you need to claim progresses. While this is hardly an original method for adding difficulty, the game play is fast and challenging and as you progress you are treated to some of the highest quality music every produced on a Commodore 8 bit.

The actual C-128 support in this game is subtle, but still appreciated. While the game functions only on the forty column screen, by virtue of the 128's extra memory there is extra music and a high score screen which is absent when playing on a C-64. One other benefit of playing the game on the 128 is the game loads substantially faster. While Qix does not quite represent the level of 128 support we have all clamored for, the fact that a major game producer is rewarding us by making use of some of the extra abilities of our machine is refreshing. I highly recommend Qix, and I also strongly encourage you to write to Taito and tell them that you appreciate the 128 support in Qix. If enough purchasers of Qix mention the product's 128 support I am certain that they will consider adding to their future Commodore eight bit game releases.



Loren gets ready to split the Qix and score *big* points!

C-128 CP/M Utilities from Herne Data Systems

Jugg'ler-128 (\$19.95 US, \$22.95 CDN)

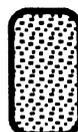
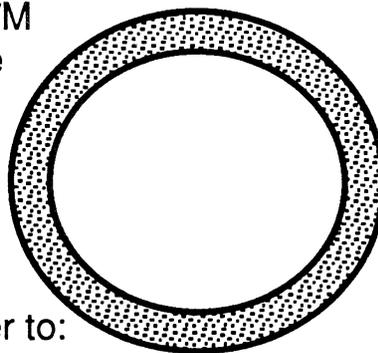
Jugg'ler lets you read, write and format over 150 types of CP/M disks on your 128. Complete with user definable default disk types for easy setup. (Requires a 1571 or 1581 disk drive).

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Qdisk (\$11.95 US, \$12.95 CDN)

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Coming soon: IEEE Drive Pack

Use your IEEE drives (8050/8250 SFD/9060/9090/4040) in CP/M mode on your 128. (Requires IEEE hardware interface.)

WHEEL & DEAL

Player: loren

Cash: \$ 25000

1.	Sleeze Magazine	
	Buy	\$ 2200
	Rent	\$ 330
2.	Wheel & Deal*	\$ 219
3.	Games of Chance	\$ 27
4.	Buy a chance card	\$ 296
5.	Pick 3 Lotto	\$ 262
6.	Stock Market 1929	\$ 57
7.	Player's Portfolio	\$ 329
8.	EXIT	



Owner: Bank

Review by Frank Hudson

Are there any American citizens past the age of 10 who haven't played the national pastime: Monopoly? Yes that's right, for the average avaricious young'un the perfect moment on the "Field of Dreams" isn't a diamond in Iowa bisected by a towering drive into the potential Post Toasties, it's watching big brother or sis landing on Park Place with a hotel and asking for the bankrupting rent payment. While it's not quite heaven, Wheel and Deal, a new 80 column mode game from Free Spirit Software, promises similar fun on your Commodore 128.

Monopoly is a trademarked game owned by Parker Brothers, and Wheel and Deal is not a Monopoly clone, but their central concepts are similar. The object in either game is to bankrupt the other players while making a pile yourself. Buying and selling of properties and collecting the rent owed on them is the prime strategy.

Wheel and Deal takes a much more cynical view of the world of commerce than the 50 year old Monopoly game does however. Inside the Wheel and Deal universe, everything has its price, a price that there is a multitude of ways to avoid paying. Wheel and Deal's designer David Krohne evidently intends some of this "weasel-factor" as a kind of economic satire. That's fair comment, but at times the randomness of rewards seems to hurt game play in ways that suggest poor game design or programming practice. The game's documentation does not make evident which of these troublesome elements are errors or which are "undocumented features", but regardless they are part of the way the game plays, so let's get on with the description of Wheel and Deal.

On loading (the game does not self-boot) a title screen is displayed accompanied by a jaunty calliope tune. Names for two to four players are prompted for and then a screen announces to the players that their goal is to make \$100,000 in order to receive dear departed Uncle Humphrey's estate. After a click from a joystick or mouse button, the main game screen appears and the game begins with each player staked to \$25,000.

As each turn commences, the players normally find themselves on a property, which may be purchased from the bank if the property is unowned by another player. Sometimes you must pay taxes or you get a windfall, and a "Chance" card can be drawn too. Just like Monopoly you say? Ah, but if you don't like the set price of a property you can purchase it at an auction for a random price determined by the computer. And instead of buying or passing, each player is offered a set of additional options which can make or lose money: you can play the horses or craps, take long odds and enter the lottery, or speculate in the stock market.

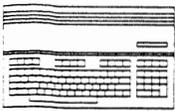
Suppose the property you land on is owned by one of your competitors? Time to ante up? Not necessarily. In Wheel and Deal you can tell the landlord to "sue me for it" and end up owing a few bucks instead of the thousand or so the property owner might have been due, or even buy the property right out from under the landlord at a price (determined randomly by the computer again) which might even be lower than the rent! It's as if the well-ordered world of Monopoly had been overtaken by the greediest of corporate raiders.

Although the game documentation and screens tell you that your goal is to make \$100,000, it is possible to win by elimination, that is, if all your competitors go broke the remaining player wins no matter what their net worth. Those that do make it to a hundred grand are "rewarded" with a screen that adds a final punchline to Wheel and Deal's world view. The 80 column mode game screens are colorful and for the most part well done. I used a 1351 mouse and menu selections were sure and smooth with this device. Wheel and Deal did not crash or hang during my testing, but once again programmer Krohne has unaccountably forgotten to disable the run/stop key. The length of player names is not sufficiently tested either, as longer names will mess up the screen display format.

The player names are not the only thing poorly tested about Wheel and Deal: the stock market section prompts you to buy from 10-99 shares of stock, but accepts 00 to 09 just fine. Entering just 9 and [RETURN] is read as 90 shares by this same routine, and like many options in this game, there is no way to "back out" from an unintended choice. When a player has gone bankrupt, messages appear that they are out of the game and that their property has been repossessed. Yet when a remaining player lands subsequently on the departed player's property and ends up paying rent, the departed player is reincarnated, sort of this "zombie player" who cannot win by elimination, though they can if they make the hundred grand.

Wheel and Deal's chief design flaw is in the central landlord/rent section. This is the only portion of the game that calls for interaction between the players, yet the whole process of rent-paying is too easily circumvented to be of much real use in achieving the game's goal. Virtually any other choice on the landing players menu will either surely or possibly dodge payment to the landlord. The last option on any player's menu is "Exit", which then asks for a confirming "Y" or "N" to end everyone's game (like the active run/stop key, a Y here is a sure argument starter if selected through accident or design by a sore loser). If Exit is chosen, but then backed out of with a N, the landing player's turn is effectively skipped, making it very hard to eliminate players with little cash who wish to play defensively. Odds on most of the "gambling" options so favor the house that it will be a rare run of luck that leads to accumulating the needed \$100,000 through them. The smart-money move in Wheel and Deal is to play the stock market heavily whenever the stock prices are low, which allows the accumulation of \$100,000 in as short as two or three moves if accompanied by reasonable luck. But since the stock market section is played solo and its outcome is random, winning this way is not very satisfying.

Although adults might enjoy a couple of rounds of Wheel & Deal for its jaded view of the world of commerce, the game has little lasting interest. Children might have enjoyed a more fully error-tested version with less randomness in rewards. Though prolific 128 software author Krohne displays here a sharp satiric take on the "Grow Rich By Investing In Real Estate" dream, Wheel and Deal in its present bug-ridden form is just not a very good game.



by Frank Hudson

Welcome once again to the Twin Cities 128 New Age sector, the only place in North America where you could find out why the astral traveler should use Punter protocol, but then that's a story for another issue, because we've got your mystic mathematics for your C-128 right here.

"Mandelbrots" and "Fractals". If you think I'm looking at a delicatessen menu, you've been doing too much meditating this decade and not enough reading of scientific literature. Seems Professor Benoit Mandelbrot was working in the lab late one night when he tripped over a category of numbers that when plotted, produced paisley light shows and tie-dyed geometry. These plots have infinitely curly lacework edges ("fractals") drawn by running mathematical calculations. Professor Mandelbrot must have been out of town during the Sixties, so instead of contacting the Grateful Dead for the proper musical accompaniment of his discovery, he published a few papers in the usual journals, and from there fractals have been picked up by the public at large. The consequences are that Professor Mandelbrot's name has become a household word at least in those households that subscribe to Scientific American, the set of numbers he found are now called the "Mandelbrot set", and the plots they produce are informally referred to as "Mandelbrots". What a lucky guy, Benoit. After all, it's not every novel mathematical theory that produces neat pictures.

Here's a description of the Mandelbrot set and how it plots a fractal in plain English:

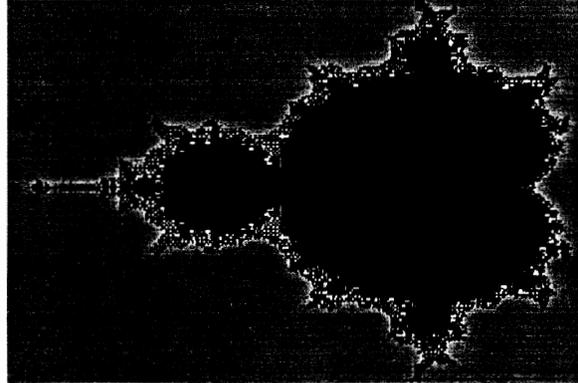
"A mathematical object which combines the idea of fractional dimensions with complex numbers. Complex numbers consist of two parts, 'real' and 'imaginary,' and are written in the form $a + bi$, where a and b are ordinary floating-point numbers and i is the square root of negative one. Of course, the square root of negative one cannot be computed, but it doesn't have to be since it will cancel itself out in the computations. Every complex number can be described as a point on the 'complex plane,' a two-dimensional Cartesian coordinate system in which the real part (a) corresponds to the x axis and the complex part (b) corresponds to the y axis. An area of this plane can be described by its boundaries; four sides, two real and two imaginary."

I trust you all now understand fractals and their relationship to the Mandelbrot set, or at least why the TC-128 New Age editor gets this review!

How can the 128 owner bring this show to his home computer? Tasmanian Software has just the ticket: Fractal Navigator for the 128. Working in 40 column multi-color mode, Fractal Navigator will produce four-color Mandelbrots on your screen, or even higher resolutions may be calculated inside your 128 and then displayed to the printer. Knowledge of higher mathematics is not necessary, as the program works from menus and the 128 does all the work.

And speaking of work, you might want to set your 128 to do the calculations and then leave for your employment while the plotting is going on. A screen Mandelbrot takes about six to eight hours to plot and the printer 'brots take even longer to cook. This sort of time-frame is an inevitable result of the 128's relatively slow processor speed, even though Fractal Navigator goes into fast mode to do the plotting.

FRACAL NAVIGATOR

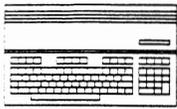


As per fractal theory, sections of the plotted Mandelbrot can be infinitely magnified revealing new levels of detail. This process requires the 128 to once more recalculate the screen for several hours, and of course the new magnified section is of no greater resolution than the original Mandelbrot, it's just different.

Plotting the output for the printer allows for a higher resolution Mandelbrot however: 1024 x 1024 with seven colors instead of the 40 column 160 x 200 four color screen display. For the higher resolution plots (Fractal Navigator calls them "Megafractals") no screen display is attempted, instead the calculations are written to disk from which they can be displayed on the printer from a menu command. Printer drivers are supplied for the Star NX1000 Rainbow color printer as well as the black and white NX1000 and the older Star Gemini models, but only the color printer is supported for the higher resolution Megafractals. I found that the program will print out on my Epson model printer using the NX1000 driver, but since no attempt is made to represent the screen colors with grey-scale dithering on this non-color printer, the results were lackluster. No other printers are directly supported, but the handsomely printed 17 page Fractal Navigator manual does give users information on writing custom printer drivers. The addition of further printer drivers and capabilities would certainly aid in the marketing of this program.

Once plotted, any screen Mandelbrots can be stored on disk for quick retrieval later, and the REU ram disk is supported by the program. The manual is helpful in describing the disk file format used, but no provisions are made for direct file conversion to popular C-64 or C-128 graphics file formats. One other unusual thing about Fractal Navigator is that it is written in C-128 Super C, a language that I had previously considered more of a curiosity than a serious 128 development system.

Is Fractal Navigator worth purchasing? Judged by the usual 128 standards of usefulness and productivity, it's hard to justify. Although the "What is a fractal" paragraph above is quoted from the manual, Fractal Navigator is not really an educational program. However, anyone interested in mathematics is also probably interested to some degree in the properties of the Mandelbrot set. The screen pictures are inexplicably fascinating to look at, and Fractal Navigator works well. Owners of NX1000 Rainbow printers will find that Fractal Navigator makes for a good demonstration of its color capabilities, and access to this printer is currently required to get the most out of the program. In the end, Fractal Navigator should be considered an entertainment no less than the games reviewed in this issue.



FUN PAK 128

by Frank Hudson

This issue of Twin Cities 128 has spared no effort in searching out the best of the new crop of 128 mode entertainment software. In this issue you'll read about the best public domain and freeware games, several commercial offerings, and a look at a full year of a "magazine on a disk". As it happens every one of the games discussed in this issue has passed through my disk drive on its way to review. I played most of them briefly, some of them a bit more extensively, but it was rarely difficult for me to remind myself to put the joystick down and return to the keyboard.

Games tester for TC-128--nice work if you can get it! Imagine being a suds-loving brewmeister for a brewery with sloppy quality control or a food taster for a king with a good-sized collection of enemies. For every public domain game you see reviewed in this issue, two were deleted from consideration because they were unable to hold my interest for even a few minutes. There were winners and losers in the pay-for-play class as well. So it was the best of the new stuff that made it far enough for you to see it reviewed in this issue.

Through it all, one collection, Fun Pak 128 from Run Magazine, stands out for consistent play value. Fun Pak is a single 1541 format floppy collection of eight games, all of which are worth looking at. In fact, one game included on the disk is equal in overall quality to the games from conventional software houses, and a couple more are but a step below that level. All operate on any 128, and since they have no disk copy protection, all can be installed on a 1571 or 1581 disk drive for fast access. A nicely done, 28 page instruction manual is included. Most of the games store their high scores to disk for bragging rights, although this routine will not work when the game disk is not in drive 8.

Fun Pak 128 is split evenly between 40 and 80 column screen modes. The 80 column screen is supposed to have poorer animation possibilities balanced by a potential for higher pixel resolution, but three of the action/arcade type games on the disk are in 80 column mode. Programmers seem to be enjoying breaking new ground on the 128's hi-res screen.

Death Quadrant is a kill-the-sprites-in-outer-space number, which is both unhampered and unhelped by being in 80 column mode, that is to say: action is fluid, but the screen is no more colorful or detailed than any number of 40 mode column games.

Nighthawk 128 is another shoot them before they hit you opus. The story here is that you are firing harpoons from your rolling motorcycle at vampire bats, a natural screenplay idea for a Roger Corman grade B movie production if you ask me. The 80 column animation is a tad lethargic, but the game plays OK. Around the TC-128 office we call this one "Killer Mosquitoes" because the sound of the sinister bats approaching recalls nothing so much as the mighty wing-flappings of the Minnesota State Bird. The whole thing is resoundingly silly and a good goof.

Let's move on to a C-128 80 column rendition of a computer classic, Breakout, here called Bye, Bye Brick. Again, there is little here to remind you that you are in 80 column mode, which is a compliment to the animation and a factual report of the game's "suddenly, it's 1983" graphics style. The bricks stream across the top of the screen in familiar fashion and the Son of Pong paddle and ball do their stuff below. There are no newfangled

Arkanoid modifications to the game strategy here, just simple mindless fun. Perhaps I'm getting old fashioned, but I really liked Bye, Bye Brick. No complicated joystick combinations to recall, no "what am I supposed to do in this mode now?", just "see the ball, hit the ball".

The last 80 column Fun Pak game is Gwynell, a maze and monsters, hit points saga. The graphics here are monochrome, but the creatures you meet in the hallways are well detailed. As far as gameplay goes, Gwynell seems to be at least average of type, but my lack of skill in this breed of gaming didn't allow me to fully appreciate the depth of its strategy. Many enjoy these graphic adventures with their endless halls, doors, and levels, but I always feel like I'm irretrievably lost in an apartment building full of Renaissance Faire players. To each their own I guess. This game is written by TC-128 contributor Anton Treuenfels.

Connoisseurs of mind games and brain teasers will probably like two 40 column games included here, Cubix 2 and Cubix 3. The grandfather of these colorful games is Rubic's Cube or Towers Of Hanoi and the like. Addictive? Having mastered one of these diversions, the beforementioned connoisseur will inevitably seek out a fresh challenge. Cubix 2 and Cubix 3 share only a name, general game type and author, so a new puzzle is only a disk load away.

Mazamorf takes another computer classic and rings some new changes on it. The concept is borrowed from Pac Man and its ilk: your alter ego sprite being pursued by four skull-like Green Meanies through a maze. The twist is that the maze changes often and unpredictably. Despite this novel touch, game play is simple and entertaining.

Which brings us to Bloodstar, the featured attraction on Fun Pak 128. From the movie-like title screens to the level of documentation (over 16 pages!) it is apparent that Bloodstar would be worth Fun Pak 128's price all by itself. Bloodstar runs in 40 column mode and makes good use of the 128's sound abilities. Graphics and animation elements are seamlessly employed to represent actions. The player must marshal resources to launch an entire space program in competition with 3 other states controlled by the computer, each of which can be allied or opposed to your efforts. During the progress of the game, colonies and interplanetary industries are set up, space fleets built and launched, and hostilities are an ever-present threat. Each game turn represents one game/month of effort, and the whole game takes 120 turns to complete. That translates into over 10 hours real earth time folks! Since Twin Cities 128's copy of Fun Pak arrived a week before deadline, we've not yet had time to actually complete a full game of Bloodstar. However strategic depth appears to be sufficient to keep dedicated gamers intrigued for some time to come.

One quibble however, the RUN STOP and RESTORE key combination has not been disabled, a grievous and easily correctable fault in a game such as Bloodstar.

If Bloodstar's combination of realistic science fiction and strategy sounds interesting to you, and you have developed a taste for deep games offering extended gameplay, then I think you will like this game a lot.

Fun Pak is a cut above what I expected from a budget priced disk, and well worth its price of \$19.95. While several of the games are derivative, they play well and they play on the C-128 in native mode. While the animation and graphics execution of most of the games is not up to the state of the art on the 64 mode, the techniques demonstrated on the 128 (especially the 80 column screen) are worthy of study.

bum bum BUM badah bum bum BUM... GAMES IMPOSSIBLE

by Nathan Beck

A catchy Lalo Shifrin tune in 5/4 time was playing in my head, while I carefully checked my eyelids for leaks. My feet were propped on the stained blotter in the center of my otherwise empty desk. Madge was in the outer office making herself pretty.

Suddenly, the phone rang once. I wondered if that was a signal. Madge didn't answer it. She always waits at least 3 rings - more when her nails are tacky. Several minutes passed before the phone rang again. Another single ring. It was the signal.

Instantly alert, I jumped into my fedora and jacket. On my way to the door, I checked my calculator's battery; it was fully charged. As I strode to the elevator, I carefully arranged the pens and pencils in their INFO magazine pocket protector. Suitably armed, I made my way to a phone booth in a nearby parking garage.

Stepping into the booth, I spied the familiar Japanese tape player hidden beneath the shelf under the phone. A bead of sweat formed on my brow. Hesitantly, I retrieved it and pressed the play button. I was rewarded with the sound of a familiar voice...

"Your mission, should you decide to accept it, is to review the games you'll find on the computer disk taped behind the bumper of the red Ford parked behind you. This mission is especially dangerous, as the Director himself had a hand in some of them. This tape will self-destruct in 100 jiffies."

Quickly, I unholstered the trusty calculator, but before I could convert the 100 jiffies to seconds, the tape deck burst into flame and was rapidly reduced to a puddle of molten plastic and transistors.

After retrieving the floppy, I hurried back to the office, where I secluded myself at the computer and began this improbable mission: Review the best C-128 Public Domain Games that Voyager Mindtools, with its far-reaching network of agents, could find. Here follows my report on 18 of the best games for the C-128:

GEOGRAPHY - An educational program written in BASIC for the 40 column screen. It's an excellent tutor of the states of America or the nations of Europe, their locations, and their capitals. This is ideal for youths (or anybody interested in the world around us). Through the ingenious use of 2 Doodle! type pics, it can display a map of the US or Western Europe, highlight a region, and allow you to guess the name of the region (or its capital). You select the region, capitals or region names, and number of questions. My only complaint (beside the slow pace while the program "randomizes" the questions) is that the author calls the Soviet Union "Russia". It could benefit from the inclusion of the names/maps of the Soviet states (Latvia, Estonia, etc.), and maybe compilation for greater speed. It does, however, load the maps very quickly from a 1581. Phil Wegrzyn deserves high praise for this one. Note the music!

SIMON SAYS - This is an 80 column simulation of the children's toy called "Simple Simon". Written in BASIC 8, it is quite good and can stretch the abilities of even the best minds quickly; thus, providing a good tool to help children develop short-term memory. The display is beautiful, and includes help at the touch of a key. Also, you can "cheat" and review the proper color sequence if you get stuck. As if that weren't enough, the game

includes synthesized speech! (Rumor has it that the speech ability is derived from the Free Spirit product called "DigiTalker" written by the infamous binary assault agent L. R. Wallace.) Also noteworthy is the use of a technique (described in Issue #25 of TC128, "Inside BASIC 8 Structures") where structures have been combined into a large binary file to speed up loading, and eliminate excessive disk access. Not surprisingly, this one is a product of L. J. Lovhaug, director of VMI. I can't determine if the program is intended for the 16K video ram equipped C-128's or for 64K, as I ran it on a 64K machine. It did become obvious, however, that the program won't work with the ROM version of BASIC 8. That's not a problem though, because it came with the BASIC 8 Run Time Library included.

MASTERMIND 128 - This is another superb game again by L. J. Lovhaug for the 80 column C-128, written in BASIC 8. There are versions for either 16K or 64K screen memory equipped machines. This is an old game, as far as computers go, where you must determine the correct placement of four of a possible six different colors in the proper sequence. Anyone can benefit from this one because it exercises the "deduction muscles"! As with the previous game, the display is absolutely perfect (in either version), but the 16K version uses a slightly smaller display. More noticeable than the screen size is the speed difference between the two versions: A graphic demonstration of the superiority of the 64K screen memory!

NORAD HELLO - This is a neat 80 column version of the old "Oops! I've started WWII!" prank. It simulates a telecommunications program connecting with NORAD. Although it's written in BASIC, Robert Woodall made it frighteningly realistic. Hints are obtained by listing the program. Scare your friends!

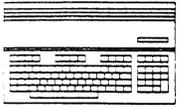
MAXIMIZE V3.0 - An enthralling number game for the 40 column screen, played on an 8 by 8 grid. The grid is populated with numbers (both positive and negative), and the 2 players (human and computer, or 2 humans) move in perpendicular directions and select the values to add to their total. Movement in this very addicting game is accomplished with the SPACE BAR and RETURN keys. Players move either horizontally or vertically. A witty "doc" file is included! This one is a lot of fun!

OTHELLO - It had to happen, folks. This old game has been translated to the C-128 80 column screen in BASIC, by someone called Dodger. The display is composed of a grid of X's and O's, but gameplay is as expected. There are 2 levels of strategy that the computer can exercise, but unless you are gifted you'll get beaten by both easily!

RISKEY WARFARE - Another 80 column BASIC adaptation of a classic board game, this display is made up of a map of keyboard graphics (LORES). Having led a sheltered life, I can't compare this version to the original from experience. But the program is heavily commented and gameplay is straightforward. Wayne Huling has done a thorough job on Risky Warfare, and his attention to detail is evident by little things such as the nifty scrolling introduction.

YAHTZEE - Yet another 80 column adaptation of an "oldie but goodie". This BASIC version of the dice game was adapted by John Teeple from a version for the IBM PC. The display is very detailed, consisting of the scorecard and the dice. An introduction provides rudimentary instruction, but no hints on strategy. Like the previous 2 games, this is a faithful rendition and it's a worthy addition to your library!

continued on page 16



continued from page 17

SIGMA LEAGUE BASEBALL V1.1 - This little gem will easily win your heart. This is the finest baseball simulation I've ever seen in the Public Domain, and when you consider that it's written in "plain old" BASIC, it's outstanding! The author (known only as "Sigma Seven") has managed to create a very flexible game, which comes with its own construction set so that you can create pools of players with statistics you input. There are loads of little tunes (written by Louis F. Sander) built in. The 40 column graphics for the baseball diamond are a bit bland, but they serve the purpose. Version 1.2 is promised, which will include more sound effects, and a more realistic display. The game plays smoothly, but it occasionally slows. This problem could probably be corrected by compiling the program. All in all, if you like baseball, you must get this one!

FOOTBALL 128 - This 80 column football simulation shares some of the good points of Sigma League Baseball: You can create a pool of players using real-life statistics, and exercise your manager's prerogative to pick and choose from the pool. The display is text only, but it's still unique. The author ("John Jr.") has managed to display three different character sets on the screen simultaneously, which is quite a trick in BASIC! You'll like this one, but I suspect that game play is random, rather than being based on player abilities/statistics.

SPACE DUST - This one is a cross between Battleship and Star Trek. Played on the 40 column screen, you use your joystick in port 1 to emulate the various types of ships in space (Scouts, Orbiters, Shield Webs, etc.). After both players have done this, the fun begins. The display is colorful, even if the action is portrayed rather simply: Every hit of an enemy ship is shown with big splashes of color. This one was written by James Garrett in BASIC, and then compiled. Its only noticeable fault is a slightly jumpy area where the screen is split between the playing field and the text area. If nothing else, this program demonstrates that the Battleship game can be improved upon with a nice display. The only thing I can't figure out is how you keep any human opponent from watching while you place your weapons!

STAR TREK 128 - This is a C-128 implementation of the ubiquitous Star Trek game adapted for nearly every computer system ever created. Written in BASIC and "ULTRA HIRES" (Lou Wallace's precursor to BASIC 8), this game provides an excellent display in monochrome on the 80 column screen (16K or 64K screen memory). Full instructions are included. Personally, I've never been too fond of this type of game, but this one is a winner! Princeton University student Brian Kendig boldly goes where no man has gone before, for a small donation. Contact him at 496 Keebler Road, King of Prussia, PA 19406, and send him \$10 or so.

STRATEGY BLACKJACK - As the name implies, this is a Blackjack game, but that's not all! It will also help you develop a blackjack strategy for either Las Vegas or Reno rules games (the differences are explained), with up to 4 decks of cards. The game will provide suggestions for play, if this option is enabled. Game play is excellent, and you can save your "stake" to disk to continue playing later. Game strategy is based on the "Lawrence Revere Basic Strategy System", whatever that is. Written in BASIC (and then compiled), it is intended to be played on the 40 column screen, but you can use it on the 80 column screen if you use a little imagination. Strategy Blackjack is shareware (\$5) by Charles G. Schilling, P. O. Box 12034, Kansas City, MO 64152. If you are a serious player, this could be a sound investment!

CHECKERS 128 - My Grandpa taught me this game, and it's a shame that he isn't around to see this! This is a conventional Checkers game played on the 40 column screen with one or two joysticks (one for each human player). Even though it's written in BASIC (uncommented), author Cobra Man has done a great job. After an initial 25 second wait (in which the board is drawn), the pieces are drawn and game play begins. You use a cursor to select the piece to move, and its destination(s). Game play is fast enough, even though the pieces you move are redrawn after every move. Unfortunately, you can't cheat!

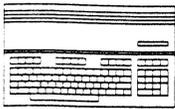
MAH-JONGG V2 - Talk about your classic games... Mah Jongg is at least 3,000 years old, and has finally been translated to the C-128 for the 40 column screen. The program consists of a well commented main BASIC routine (with ML input routines, for speed), a DOC file detailing different versions, a SEQ file reader, an AUTO-BOOT creator for Mah-Jongg V2, a file containing the tile definitions, and a mouse driver. When first run, the program is a little slow to begin, but once the screen appears you'll appreciate the delay. The game pieces (tiles - a very good example of the utility of the GSHAPE and SSHAPE commands) are very detailed, game play is smooth and professionally done, and the game is truly fun to play. We should be grateful to Kurt Tappe for this excellent solitaire version of the ancient game!

ASTRA INVADERS - This is an arcade "shoot 'em up" for the 80 column screen. Written in ML, and using redefined characters, the action in this "Space Invaders" styled game is fast and furious. One or two players can compete using a joystick in Port 2, but you'll have a hard time getting high scores: And that's a shame, because the game saves high scores to disk! Written by Chris Batchelor, this is a good example of the things possible on the 80 column screen.

BURGER WHOP - Another 80 column arcade delight. This game is simple in theory (you build hamburgers) but difficult in practice because the enemies (hotdogs, and others) go to great lengths to stop you. I'm not sure that the C-64 version was ever released in the US, but now the game is available for your C-128; and it was worth the wait! The graphics are excellent (even though they're just redefined characters, and not sprites), and the game is fun to play. Use either joystick. Author Brian L. Copeland originally wrote this in "C", and this version is a hybrid of "C" code (in Bank 1) and ML (in Bank 0). I get a kick out of killing the baddies with a hamburger bun!

ALIEN INVADERS - This is my choice for the best PD Game for the 80 column screen of the C-128! An adaptation of the original arcade game Space Invaders, it will impress you with both the quality of the display and its speed. Written entirely in ML, it is played with a joystick in port 2, and it plays exactly like the original. While it's obvious that the little thingies are redefined characters, you'll swear that they're sprites! You have a choice of 3 levels of difficulty, and the program will automatically go into "demo mode" if no keys are pressed for a few moments. This is a professional quality game, and author Darrell Spice, Jr. could surely have published it commercially. Nevertheless, in keeping with the purest traditions of Commodore computing, this masterpiece is free to anybody who wants it!

Having accomplished the mission, I returned to my desk, propped my feet up on it, and began the long wait for payment for my services. Assured that a check was in the mail, I resumed my careful examination of the insides of my eyelids... Still no leaks...



DIGITALKER 128 REVIEW

by Loren Lovhaug

After an amazing C-128 software achievement such as BASIC 8 one would think it would be nearly impossible to produce a follow-up product that could even come close to matching the quality and innovation of the original. However, C-128 master programmers David Darus and Lou Wallace have accomplished just such a feat with their latest release, Digitalker 128.

Like BASIC 8, Digitalker 128 is aimed at C-128 BASIC programmers who want to tap into some of the incredible power and versatility that is built into the Commodore 128. The Digitalker package contains two double-sided disks with over 500 kilobytes worth of digitally sampled sounds. These sounds can be played from within your programs through the use of one of two provided assembly language wedges. The first routine allows you to play sampled sounds under BASIC 8 as BASIC 8 structures. The second routine allows you to play sound samples from BASIC 7.0. Working with sound files from BASIC 7.0 is a bit more difficult than from BASIC 8, because under BASIC 7.0 you must keep track of various housekeeping information regarding your sound files and pass it to the assembly language wedge at play time, whereas under BASIC 8 this is handled automatically by BASIC 8's memory management/structure system. Also on the disk are a number of demonstration programs showing you how to use the wedges as well as a utility for altering the speed at which the sampled files are played.

The sound files themselves are made up of various words and phrases, most of which pertain to the creation of computer programs such as "press any key when ready", as well as the letters of the alphabet, the numerals, and the C-128's colors. The sounds are produced through the use of the white noise and volume registers on the 128's SID chip and are extremely lifelike. In fact, with a good speaker attached to the 128, the samples can easily be mistaken for live human speech.

The manual which accompanies Digitalker is a bit terse, but includes all of the information one needs to write programs that incorporate the digitized sound samples. The manual also explains the terms of the license agreement which allows you to distribute the sound files and the player routines along with your programs. If there is any drawback to Digitalker 128 it is that the sound files are so very large that it is difficult to incorporate several sounds in your programs without memory expansion, but such is the nature of digitally sampled sound.

Lou and Dave have used their extraordinary level of expertise to not only provide programmers less gifted than themselves with a fantastic tool, but in so doing they have actually extended the 128's abilities beyond what was previously believed to be possible. With Digitalker 128, you can enhance your own game and educational programs with high quality digitized sounds quickly and easily. I highly recommend Digitalker 128.

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A new concept in Commodore cartridges! Store up to 30 of your favorite programs in a single battery backed cartridge for easy and instant access. Change the contents of the box as often as you wish. The Quick Brown Box accepts most unprotected and "frozen" programs including the only word processor that saves your text as you type: The Write Stuff! The box even co-exists with GEOS, and the Commodore RAM expansion units. Loader utilities included for both the Commodore 64 and Commodore 128

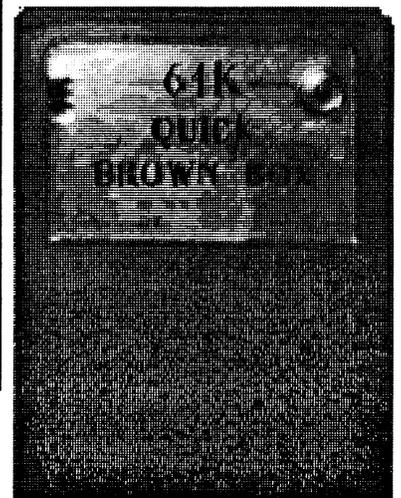
- 32K Quick Brown Box.....\$99
- 64K Quick BrownBox.....\$129
- Utilities Disk.....\$6
- Q-Disk CP/M RAMdisk.....\$10

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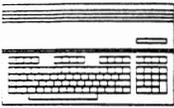
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DISK DOUBLER

by Nathan Beck

The Commodore 1571 is probably the smartest disk drive ever made. With burst mode speed, approximately 340K storage space, and the ability to read or write to virtually any GCR or soft-sectored MFM disk format, the 1571 is a very versatile device. Yet, four years after Commodore began making the 1571, its users still strive to realize its full potential.

The 1571 drive is a mixture of the old and the new. The original 1541 ROM survives nearly intact, but the 1571 ROM contains another 16K of new code. This article focuses on one of the many improved routines in that newer code: the routine that handles disk formatting. It's composed of two main segments, one for each disk side, and allows you to format the rear side of a single-sided disk without damaging data on the front side. It can "double" your disk storage capacity!

Formatting the rear side of a disk is as simple as storing the maximum number of tracks (plus one) to be formatted in the proper location in drive RAM, and then executing the code in drive ROM that formats the rear side of the disk. This is an undocumented feature of the 1571 disk drive, but it's remarkably easy to use.

Before this feature of the 1571 was discovered, users who wanted their favorite programs on double-sided disks had to copy the files from a single-sided disk to an empty double-sided disk. Another method involved formatting a double-sided disk with the same ID as the original program disk, using a whole disk copier (or nibbler) to copy the original disk onto it, and then modifying the copy with a Sector Editor program. Unfortunately these methods didn't always work, either because the program disks contained data that users weren't aware of, or because the actual disk ID was difficult to discern. This method, a program called DISK DOUBLER, solves these problems.

Let's examine it. Lines 10 and 20 open the disk drive command channel, put the 1571 into double-sided mode, jump to a subroutine (lines 170 to 200) that reads the error channel, open another channel to communicate with the drive, and set the drive memory buffer that we'll use.

Lines 30 through 80 check position 3 in the disk's Block Availability Map (the double-sided flag) to prevent damage to a disk that's already double-sided. (While this check of the double-sided flag isn't strictly necessary, it should prevent some nasty letters to the editor!) If line 80 is ever executed, it's because the BAM contains an unexpected value where the double-sided flag should be. Line 90 sets the "buffer pointer" to the same byte we just checked. Lines 100 and 110 set the double sided flag and write the modified BAM back to the disk.

The heart of the routine is in lines 120 through 140. In line 120 we write the number 71 into drive RAM at location 684 (\$02AC), because that's where the format routine expects to find the maximum number of tracks (plus one) it should format.

Before we can format the back side, the drive needs to know what disk ID to use. Line 130 "initializes" the disk: This reads the disk's BAM into a drive buffer, and also stores the disk ID in drive RAM at locations 22 and 23 (\$16 and \$17). (Note that the ACTUAL disk ID is stored there, and not the COSMETIC ID that appears in the BAM. The cosmetic ID and actual ID are identical on normally

formatted disks, but it's easy to change the cosmetic ID and confuse the issue. Always use the "initialize" command to provide the correct disk ID to the second segment of the format routine.)

Line 140 executes the subroutine that formats the rear (side 1) of the disk. This subroutine is located at 42053 (\$A445) in the drive ROM. After checking to see how many tracks it should format, and what ID it should use, it begins formatting the disk from Track 36 to Track 70.

Line 150 validates the disk. The standard validate command is used here (and in similar programs published elsewhere) as a quick way to place the correct values for a double-sided disk in the BAM. After a final check for disk errors, line 160 prints an appropriate message and ends the program in line 200.

This procedure seems complete, but it has a flaw that could lead to serious problems with certain applications: The disk is validated! While validation is the proper way of dealing with improperly closed ("splat") files, it's not always a good idea.

You see, disks may have data or program code stored randomly on the disk. GEOS disks are a prime example, and C-128 "boot sectors" are another. This data is usually accessed directly by some other program which already knows where to seek the data/code. Programmers usually allocate these blocks to protect the data from being overwritten. If a disk containing "hidden" data is validated, that data will be vulnerable to corruption.

Once we recognize the problem, a solution suggests itself. Since the values in the BAM signifying empty tracks are known, it is simple to write the correct values to the BAM directly. Thus, DISK DOUBLER Part 2 was created.

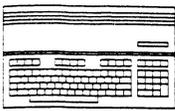
A quick study of the BAM: Just as Track 18 contains the BAM and directory blocks for a single-sided disk, Track 53 contains similar information about the back of a double-sided disk. Since the original 1541 BAM block (Track 18 Sector 0) isn't large enough to record both how many blocks on the back side are used and where they are, the 1571 uses an additional block at Track 53 Sector 0 to record exactly which blocks (of Tracks 36 - 70) are used. The data in positions 221 through 255 of Track 18 Sector 0 merely indicate how many blocks are available in each track (from 36 through 70).

All of Track 53 is allocated (note the zero in position 238 of Track 18 Sector 0) for use as a BAM block and additional directory blocks (if needed). Directory entries in Track 53 are structured exactly like those on Track 18. See the 1571 User's Guide for more information about disk formats.

To create an improved DISK DOUBLER, enter part 2 while part 1 is still in memory. The two parts of the resulting program have been numbered to allow this merger. Save the combined program with a unique name. But, before you try it out, let's see what's been added...

Notice that the original line 150 has been changed. It now jumps into the routines in part 2, instead of validating the disk. It's necessary to re-open channels 15 and 8, reset the drive memory buffer, and re-read the BAM (line 210) because the 1571 format routine apparently closes disk channels when it ends. The new line 150 closes those channels, but only because the computer still thinks they're open.

continued on page 21



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The next several lines of code put values in the BAM (Track 18 Sector 0) corresponding to the number of blocks available in Tracks 36 through 70. Except for line 250, which writes a single 0 to allocate Track 53 Sector 0, lines 230 through 310 are composed of four simple loops that write the appropriate bytes to positions 221 through 255. Just as line 220 reads the block into the drive RAM, line 320 writes the modified block back onto the disk.

The second BAM block is read into drive RAM by line 330. Lines 340 and 350 read the data statements (lines 380 through 490) and write this data to the drive RAM. This data, when found in Track 53 Sector 0, tells the drive that each block on the rear side of the disk is empty. Line 360 writes the data in drive memory to the disk. Line 370 initializes the disk a final time, and then returns to the main module where the program ends. Check the directory... Isn't it amazing?

You should be warned that DISK DOUBLER won't convert Commodore CP/M or MFM format single-sided disks to double-sided disks. Also, it won't work on all copy protected disks, and it won't "double" some GEOS disks. There are two reasons for this last limitation: First, early versions of GEOS placed a "42" (\$2A) where the double-sided flag should be. Secondly, later versions of GEOS boot disks have program code stored in the BAM that would be overwritten by DISK DOUBLER.

Before running the program, insure you aren't endangering data on the other side of the disk. Try to read the directory of both sides of any disk you suspect, as many commercial program disks are floppies, and some disks may be formatted as if they were two. If you want to "double" these disks, copy each side to a fresh blank disk first. Don't let these warnings discourage you, though! The program works perfectly, and you won't have any problems if you take simple precautions.

You might notice that programs that were stored on the front side of the disk prior to conversion load slower than similarly sized programs saved to the disk after the conversion. This delay is caused by the difference in "sector interleave" used by the 1541 and 1571. The speed difference will likely be slight; it's merely a curiosity without harmful effect.

Hopefully, this program will not only double your disk storage space, but also demonstrate how useful disk drive programming techniques can be. If you're interested, you could expand the program. For instance, you could include a device number selection routine, or a routine that "switches heads" and tries to read the directory of a disk suspected of being formatted on both sides (via the "U0 > H1" command). If you have older GEOS data disks, and have upgraded to GEOS Version 2, you could add a routine to allow "doubling" of these disks. Lots of options are available!

DISK DOUBLER - Part 1

```
10 OPEN15,8,15,"UO>M1":GOSUB 170
20 OPEN8,8,8,"#0"
30 PRINT#15,"U1";8;0;18;0:GOSUB 170
40 PRINT#15,"M-R" CHR$(3) CHR$(3)
50 GET#15,0$:IF 0$ = "" THEN 0$ = CHR$(0)
60 0 = ASC(0$):IF 0 = 0 THEN 90
70 IF 0 = 128 THEN 160
80 PRINT "UNUSUAL BAM!":GOTO 200
90 PRINT#15,"B-P:"8;3
100 PRINT#8, CHR$(128);
110 PRINT#15,"U2";8;0;18;0:GOSUB 170
120 PRINT#15,"M-W" CHR$(172) CHR$(2) CHR$(1) CHR$(71)
130 PRINT#15,"IO:"
140 PRINT#15,"M-E" CHR$(69) CHR$(164)
150 PRINT#15,"VO":GOSUB 170
160 PRINT "DISK IS DOUBLE-SIDED!":GOTO 200
170 INPUT#15, EN, EM$, ET, ES
180 IF EN = 0 THEN RETURN
190 PRINT "ERROR #"EN", "EM$, "T"ET" S"ES
200 CLOSE15:CLOSE8:END
```

DISK DOUBLER - Part 2

```
150 CLOSE15:CLOSE8:GOSUB 210
210 OPEN15,8,15,"IO":OPEN8,8,8,"#0"
220 PRINT#15,"U1";8;0;18;0
230 FOR BP = 221 TO 237:PRINT#15,"B-P:"8;BP
240 PRINT#8, CHR$(21);:NEXT
250 PRINT#15,"B-P:"8;238:PRINT#8, CHR$(0);
260 FOR BP = 239 TO 244:PRINT#15,"B-P:"8;BP
270 PRINT#8, CHR$(19);:NEXT
280 FOR BP = 245 TO 250:PRINT#15,"B-P:"8;BP
290 PRINT#8, CHR$(18);:NEXT
300 FOR BP = 251 TO 255:PRINT#15,"B-P:"8;BP
310 PRINT#8, CHR$(17);:NEXT
320 PRINT#15,"U2";8;0;18;0
330 PRINT#15,"U1";8;0;53;0
340 FOR BP = 0 TO 104:READ A:PRINT#15,"B-P:"8;BP
350 PRINT#8, CHR$(A);:NEXT
360 PRINT#15,"U2";8;0;53;0
370 PRINT#15,"IO":CLOSE15:CLOSE8:RETURN
380 DATA 255,255,31,255,255,31,255,255,31
390 DATA 255,255,31,255,255,31,255,255,31
400 DATA 255,255,31,255,255,31,255,255,31
410 DATA 255,255,31,255,255,31,255,255,31
420 DATA 255,255,31,255,255,31,255,255,31
430 DATA 255,255,31,255,255,31,0,0,0
440 DATA 255,255,7,255,255,7,255,255,7
450 DATA 255,255,7,255,255,7,255,255,7
460 DATA 255,255,3,255,255,3,255,255,3
470 DATA 255,255,3,255,255,3,255,255,3
480 DATA 255,255,1,255,255,1,255,255,1
490 DATA 255,255,1,255,255,1
500 REM N.M. BECK, 1989
```

Sparrow's Slick Tip:
When writing programs that load subordinate files don't assume the user loaded your program from device 8, instead use the peek(186) to determine what was the last drive to be accessed.

HACKING THE 1581

by Miklos Garamszeghy

WARNING: This article describes a hardware modification to your 1581 disk drive which may result in damage to the drive controller electronics if not done properly. In any event, such modification will certainly void your warranty. If you do not feel comfortable working on electronic equipment in confined places, then do not attempt this modification.

How would you like to feed your 1581 drive inexpensive 5-1/4 inch disks instead of its expensive diet of 3-1/2 inchers? Are you a CP/M buff who would like to be able to access 80 track 5-1/4 inch disks such as DEC Rainbow? If you answered yes to either of these questions (or if you are just a curious hacker who does strange things for the fun of it), then have I got a deal for you. This article will deal with the interesting things that can be done with a 1581 drive or parts there of.

First a bit of background about the 1581. Unbeknownst to mere mortals, Commodore did something very logical, nay profound, when they designed the 1581: they used a standard Shugart interface. What, you ask, is a Shugart interface? It is the interface (connector) between the floppy disk controller electronics and the mechanical disk drive mechanism. Why is this so important? Just about every other computer manufacturer uses the Shugart interface on their disk drives. So what, you say. Well think about it for a moment. With the electronics in the 1581 you can hook up **JUST ABOUT ANY DISK DRIVE IN THE WORLD TO YOUR 128**. Easily, plug compatible, no fuss, no muss. You have a Commodore fast serial bus to Shugart disk drive interface.

As outlined below, I have replaced the Chinon 3-1/2 inch drive mechanism in my 1581 with a Mitsubishi 5-1/4 inch, 80 track drive. With this combination, I can create 800k 5-1/4 Commodore DOS disks using cheap double density media. In CP/M mode, I can read, write and format 80 track CP/M disks such as DEC Rainbow, Visual 1050 and Altos CP/M. Of course, you can also hook up off the shelf 40 track IBM type 360k drives, and also some 8 inch drives as well. Imagine being able to read and write 8 inch CP/M disks directly on your 128!

The actual modification to the 1581 couldn't be simpler: you unplug the 3-1/2 drive and plug in the new drive.

First things first, however. Before starting, you will need:

- an 80 track, 5-1/4 inch, 720k disk drive
- an IBM PC style disk controller cable
- an IBM PC style 5-1/4 inch disk drive power connector
- an IBM PC style 3-1/2 inch disk drive power connector

Most of the above parts can be purchased easily and cheaply at (dare I say it) your local IBM clone shop as well as at most surplus electronics outlets. The only trouble you might have is in finding the disk drive itself. Preferably, the drive should be a half height, low power model (most half height models are) so that it can run off the 1581's own power supply. The 80 track 5-1/4 drive I used is a Mitsubishi 4853, available from several mail order and surplus outlets for well under \$100. (See address at end of article.) The drive itself will most likely be a 'exposed board' type, that is, without any sort of case or covering. If you do not mind this, fine. Otherwise, you can usually purchase a small metal case, specifically designed to hold a disk drive for

a few dollars from the same surplus type stores. (Some such cases come with a built in power supply. Unless your drive draws an usually high amount of power, you will not need this external power supply.) Of course, a 5-1/4 inch drive mechanism will not fit into the 1581's case, so it must be housed externally.

NOTE: The drive mechanism you will want is **NOT** the far more common 1.2 meg IBM AT style drive. It is a 720k, double sided drive. The 1.2 meg type uses a different rotation speed (360 rpm compared to 300 rpm) and data transfer rate. It does not produce satisfactory results with the controller used in the 1581.

The disk drive will normally have a set of DIP switches or jumper pins to configure the hardware. On most drives, you will have at least two jumpers or switches marked DS0, DS1 (possibly DS2 and DS3, in addition). Using the settings of these switches or jumpers is how IBM type systems can 'piggy back' two or more drives on the same cable. The first drive will be set with DS0 (drive select 0) on, the second with DS1, etc. The controller circuitry uses these lines to control which disk drive it wants to send a given signal to. With the 1581, only DS0 will be active, so you must check your drive to see that DS0 is turned on, and DS1, (as well as DS2 and DS3 if your drive has them) is turned off.

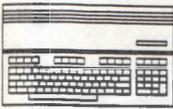
The disk controller cable should be a standard 'clone' type (i.e. without the twist) and should be at least a foot and a half long to give you plenty of room to work with. One end (that connects to the IBM type disk controller card will have a female 34 pin dual in line ribbon connector header on it. This is the same connector that is used inside the 1581. The other end generally has one or two 34 pin edge connectors for connecting to the IBM style 5-1/4 disk drive mechanism. If your cable has two connectors on this end, only one will be used but you can just leave the other where it is as it will cause no harm and is too much trouble to remove. (The cable normally used in the 1581 has another 34 pin dual ribbon header like the other end. This configuration is the standard one used for 3-1/2 inch drives.)

The power cable will probably have to be custom made. The power connector inside the 1581 is a 4 pin single in line connector, like the ones used on standard 3-1/2 inch drives. The power connector used on 5-1/4 inch drives is also a 4 pin plug, but of heavier construction. I made my connector by splicing a standard IBM type 5-1/4 inch drive power cable to a 3-1/2 drive power cable.

Before proceeding, turn off power to the drive and disconnect all cables to it. To open the 1581 drive, turn it over and remove the two screws on the bottom. The top cover should then come off, revealing the drive mechanism and controller board. Next, remove the four screws on the metal tabs that secure the drive mechanism and its support frame to the bottom of the drive case. Be careful when removing the last screw, because two cables connect the drive to the controller board (the power connector and the signal line).

Slowly remove the two connectors from the controller board end. The 4 pin connector (labeled CN 1, located near the back left of the controller board) is for the power to the drive mechanism. It contains a +5V, a +12V and two ground connections. The 34 pin wide ribbon cable (CN 2, located to the right of the power connector CN 1) is a tight fit and may require some gentle coaxing, but do not force it. Remember, always pull by the solid plastic plug part, never by grabbing the cable. A gentle rocking from side to side is normally sufficient, and of course, you do not want to bend the pins on the circuit board.

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You should now have two separate parts: the drive mechanism and the controller board. All that remains to be done is to reconnect the new drive to the same points on the controller board.

The first connection you make to the new drive will likely be the ribbon cable which carries the control and data signals. When connecting the end to the drive mechanism, make note of the pin numbers or polarity of the connection. Most drives will have a keyway or gap at one end of the edge connector, however, there may or may not be a matching keyway on the ribbon connector. The keyway is located as follows (note that keyway is relative to pins 1 and 2, the physical location, i.e. left end or right end, will depend on how the edge connector is oriented relative to the drive):

pins	2	4	(keyway)	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
	1	3		5	7	9	11	13	15	17	19	21	23	25	27	29	31	33

Locate pin 1 on the ribbon connector (it is usually well marked either by number or with an identifying dot or stripe) and make sure this end is connected to pin 1 on the disk drive. Now, connect the other end of the controller cable to the 34 pin header on the 1581 controller board, again making sure to connect pin 1 to pin 1 (the pin numbers are well marked on the controller board, but just to give you a hint, pins 1 and 2 are closest to the power supply plug (CN 1) with even pin numbers towards the back of the 1581, odd ones towards the front). Due to differences in the orientation of the connectors on the drive and controller board, you may have to put a half twist in the cable to get things to line up correctly. This is one advantage of having a longer cable. On the Shugart interface, the odd pins (1, 3, 5, ... 33) are all ground connections, while the even pins (2, 4, 6, ... 34) carry the various signals between the controller and the drive mechanism. Thus, if you get them crossed, you can do serious damage to the drive or the controller board.

The next step is connect the power cable. The cable consists of four pins:

pin +12V Ground Ground +5V

Again, be sure to connect the +12V and +5V pins to the correct ones on the disk drive. On the 1581 controller board, the +5V is on the right side end of the connector (i.e. closest to the 34 pin signal connector, while the +12V is furthest from the 34 pin connector). The middle ground pins are interchangeable and only one need be connected. As before, the pins are well marked on the 1581 board and should be well marked on the disk drive too.

Once the connections are made, you can re-assemble your disk drive case if you wish. I have my old 1581 case open (to allow easy access to the cables) sitting on top of the metal case housing the 5-1/4 drive. If you want to get really fancy, you can install a switch on the drive select pins of the signal line to let you use multiple drives. However, only one drive can actually be used at a time.

What can I do with my 1581 now? Glad you asked. Well, reconnect the drive, turn it on and see what happens. By inserting a blank disk and issuing the N0 (format) command, you should be able to create an 800k, Commodore DOS disk. What you will get is functionally equivalent to a 3-1/2 inch 1581 disk. It will be fully compatible with all 1581 and C-128 DOS commands and can be used transparently with all software that works with a 1581 drive. It even works quite well in CP/M mode. In fact, the disk controller will even think that it is still dealing with a 3-1/2 inch drive mechanism. One important note is that you will NOT be able to read or write 1541/71 style disks in your modified 1581 as the data recording technique is substantially different among these drives.

Note: If nothing happens when you try to format the disk, or the drive error light flashes, check to make sure that you have the drive select (DS) jumpers or DIP switches correctly set for DS0, as outlined previously.

I originally modified my 1581 to be able to read and write 80 track CP/M disks, such as DEC Rainbow. It is quite simple to modify your CP/M disk parameter table to support the new disk types and this has been published previously in, for example, "Inside C-128 CP/M", Transactor Magazine, Volume 8, Issue 4, January 1988. However, for those of you who do not feel comfortable with making those kind of modifications to your CP/M system files, the latest upgrade to my Jugg'ler-128 CP/M disk utility (version 4.0 due for release end of October 1989) will include full support for many 5-1/4 inch 80 track CP/M disk types specifically for use with this modification. More information on Jugg'ler can be obtained from the address listed below.

Sources:
Mitsubishi 4853, 720 kilo byte, 5-1/4 inch, half height drive from: JB Technologies, Inc 21011 Itasca, Unit #F, Chatsworth, CA 91311 (818) 709-6400

Other suppliers of similar devices advertise frequently in publications such as Computer Shopper Magazine

Jugg'ler-128 is available for \$19.95 (US), \$22.95 (CDN) from: Herne Data Systems Ltd. PO Box 714, Station C Toronto, ONT Canada, M6J 3S1

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