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Mansir/Holden, Inc.

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FROM THE EDITOR

AND NOW FOR THE NEWS . . .

t the risk of starting out this issue on a bad note, I've got some news to pass on to you that we didn't have room to include in our regular news section. CMD has been running into some glitches in getting the SuperCPU 64 ready to become a SuperCPU 128... and this has caused additional delays. The good news, though, is that the problems have been overcome at the time of this writing, and the project is now moving forward at the fastest pace possible.

What kind of glitches? Well, there are certain signals in the computer that have to be controlled in special ways to make something like the SuperCPU work in the best possible manner. CMD overcame how to deal with these signals long ago on the C-64 (and on the 128 in 64 mode); but the 128 in 128 mode is a different beastie altogether, and things must be done quite differently. Given that CMD is striving toward using the same board for both versions of the SuperCPU, these differences had to be examined thoroughly so that signals required for the 128 version (but not for the 64 version) would be readily accessible.

Of course, when problems like this crop up in the latter part of a design cycle, then time is lost not only in checking out the problem itself, but also in implementing solutions into previously completed parts of the design.

Thankfully, the problems have been overcome, and the design layouts are completed. By the time you read this, production prototypes will be in final testing, and full production should begin at the end of May.

That bit of news aside, here's another news item that I'm sure will be of value to all of our readers: We've just begun our second Subscription Sweepstakes! And yes, renewals qualify right along with new subscriptions. Naturally, the Sweepstakes always means that there are some nice prizes on the line, and this time is no exception. As usual, the Grand Prize winner will get a choice between two items... but what we think is unique about the choice this time around is that one of them is a rare piece of Commodore history—one of the approximately 200 Commodore C-65 computers! Of course, we didn't want the choice to be an easy one for the winner, so the other prize that the winner can pick is a SuperCPU equipped with the optional SuperRAMCard and 1 MB of memory.

In addition, two lucky Second Place winners will also get SuperCPU accelerators, but without the RAMCard and extra RAM. And if the Grand Prize or Second Place winners have already bought a SuperCPU, they can opt to get a refund in place of their prize. To round things out, we'll also have a dozen CMD gift certificates to hand out to our Third Place winners. For all the details, be sure to see the CW Subscription Ad in this issue. And get your renewal in early to beat the crowd!

Doug Cotton
Editor

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BACKTALK

LETTERS AND QUESTIONS FROM OUR READERS

Searching for a User Group...

I received a letter from a young lady in Fredric, WI (printed on a 1525 or MPS 801) who had recently purchased a 64/128 computer. She desires assistance in finding information and software, also newsletters from user groups.

I searched all of the CW issues for a user group near her location, but could find none listed. Fredric is about 60 miles northeast of the Twin Cities. Do you know of any Commodore group or user in the Twin Cities vicinity that I could refer her to? I have no idea why she would write to me in California for assistance. I found the CW reference to a correspondence group in Texas.

Thanks,
Wayne Waters

Sorry, Wayne, but no, we don't have any groups registered from that area. However, we have put together our largest group listing to date in this issue, and there are several unverified groups listed elsewhere in Wisconsin... perhaps one of these is close enough and still exists. You might forward those addresses to the woman and tell her to try writing to them. Meanwhile, if anyone else is aware of a group in the requested area, let us know so we can pass that info along to Wayne and out other readers.

Overseas Review

I live in Germany. At the beginning: Your magazine is fantastic! You publish many helpful courses and tips for programmers. My favourite column is "Basic Instincts". I hope David Pankhurst will write just as understandable like Gene Barker.

I have some suggestions for you. The German 64'er-Magazine organized until 1994 several programming competitions like the "2K-Byter" or the "20-Zeiler" (a BASIC program with only 20 lines but with big uses). I think that was a great idea. I hope you will integrate such competitions like these in your magazine!

Your column "Foreign Exchange" is very small. I know that in Germany many new programs (especially for GEOS) are published that you never report. For example I never had read something about the version 2.5 of GEOS.

So, I hope my English spelling is understandable. I'm gladly waiting for your answer.

First, I'd like to thank you for your compliments and for taking time to write us. While we have only a small number of readers outside of the United States, we'd like to hear more from those readers.

I believe that David Pankhurst is off to a great start, and will prove to be one of our best columnists. This particular type of assignment isn't exactly new to him—he previously wrote a similar column for Compute, though he had only a short tour with them since they folded their publication not long after he started.

With respect to programming contests, this is something that we have considered, but bear in mind that our subscriber base is small compared to that of 64'er, and that users in the US (which make up the majority of our subscribers) are less likey to be programmers than their German counterparts. Based on this, we're not certain we would get enough of a response. As we grow, though, I can forsee a point where we should at least give the idea a try.

Your observations concerning our Foreign Exchange are quite correct—it is but one small column, and can't hope to cover everything that is going on in the foreign markets. However, when we get foreign product information (or products themselves) which we feel will interest our readers, we're glad to make room for them elsewhere in our publication (geoKEYS and Riddles & Stones are a couple of examples). It's difficult for us to justify devoting a lot of time and space to products that are only applicable to our subscribers outside of the US, but we would like to see more article submissions from readers overseas to help round out the coverage in our Foreign Exchange, as well as in our reviews.

Addressing your comment on GEOS 2.5, we specifically didn't cover this for a reason. First, this isn't really a new version of GEOS at all, but simply a bundling of GEOS 2.0 with some additional utilities from the GEOS User Club (GUC) in Germany. We felt that calling this package GEOS 2.5 was extremely misleading, and to the best of our knowledge, the package really didn't contain anything that could be considered new.

Program Listing Problems

Your program Intelligence Quest as published in Lucky Issue 13 will not work as written. Your readers will have to renumber some of the line numbers.

I also could not get your checksum program to work properly. Whenever I type in a program I add two lines at the beginning to save what I have typed so far. This is where I had a problem with your checksum. Every time I typed RUN2 I would get a SYNTAX ERROR and couldn't save what I had typed.

I am also having a problem getting your CHK-LIST program to work. When I load it and type RUN the program displays the word WORKING followed by about 7-1/2 lines of dots. When the word DONE appears I type NEW as per your instructions and nothing seems to happen.

Your instructions state that "Whenever you want to check a program, the appropriate command must be typed in", but when I type SYS49152 all I get is a blank screen with the word READY in the upper left corner.

Also, the program appearing in BASIC INSTINCTS in your Nov/Dec issue will not work in the pure BASIC mode. Every time I tried it I got an ILLEGAL QUANTITY ERROR IN 1095. I have checked this line over and over and can't find any mistake in the typing.

Thank You
James Vorraso

Gads! That's a bunch of problems! Okay, the IQ program and the CheckSum program in Issue 13 were indeed flawed. Corrections for these can be found on page 9 of this issue.

Concerning CHK-LIST, it sounds like you aren't sure how it is supposed to work. Once you have run it, it doesn't display any values while you're typing in a program. It should, however, give a list of values for any BASIC program lines that are currently in memory. The idea is you run the utility, type NEW, start entering BASIC program lines, then type the SYS command whenever you want to check your work.

Finally, the BASIC INSTINCTS program you mention is, so far as I know, without errors. The kind of error message you're getting, though, indicates that one of the variables used in line 1095 contains a bad value. To see which one, print the two variables (x1 and x2) and see if one of them contains a value of less than 0 or greater than 255. If so, you probably have an error in another line of the program that works with that particular variable.

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COMMODORE TRIVIA

by Jim Brain

Welcome to another edition of Commodore Trivia. As many of you may know, these trivia questions and answers have been donated by me to the Commodore community at large. Unlike other articles in *Commodore World*, these trivia questions have been placed in the public domain. I ask only that the trivia questions remain intact and unchanged, and that my name and address appear somewhere so users can contact me. The trivia is also used for a contest I run on the Internet; contact me at the included address for more information. Because curiosity has the best of me, I always welcome a note or postcard detailing where the trivia goes. I also welcome new questions—provided they come with the answers. Enjoy!

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COMMODORE TRIVIA #13 QUESTIONS

$0C0 The early 1541 drives used a mechanism developed by _____? (Name the company.)

$0C1 On later models, Commodore subsequently changed manufacturers for the 1541 drive mechanism. Name the new manufacturer.

$0C2 What is/are the most obvious difference(s)?

$0C3 On Commodore BASIC V2.0, what answer does the following give: PRINT (SQR(9)=3)

$0C4 In Commodore BASIC (any version) what does B equal after the following runs: C=0:B=C=0

$0C6 In Commodore BASIC (any version), what happens if the following program is run:

```
10 J=0
20 IF J=0 GO TO 40
30 PRINT "J<>0"
40 PRINT "J=0"
```

$0C7 In question $068, we learned how Jack Tramiel first happened upon the name "COMMODORE". According to the story, in what country was he in when he first saw it?

$0C8 On the Commodore user port connector, how many edge contacts are there?

$0C9 On most Commodore computers, a logical BASIC screen line can contain up to 80 characters. On what Commodore computer(s) is this not true?

$0CA If a file is saved to a Commodore Disk Drive with the following characters: chr$(65);chr$(160);chr$(66), what will the directory entry look like?

$0CB What is the maximum length (characters) of a CBM datasette filename?

$0CC How many keys are on a stock Commodore 64 keyboard?

$0CD Commodore BASIC uses keyword "tokens" to save program space. Token 129 becomes "FOR". What two tokens expand to include a left parenthesis as well as a BASIC keyword?

$0CE There are 6 wires in the Commodore serial bus. Name the 6 wires.

$0CF On the Commodore datasette connector, how many logical connections are there?

COMMODORE TRIVIA #12 ANSWERS

$0B0 The BASIC interpreter has a bug in it that shows up while interpreting this question's statement. The interpreter leaves two bytes on the CPU stack prior to returning from a subroutines call. On the C64, the two bytes are both zeros. Since subroutines put the return address on the stack, the return retrieves the two bytes left on the stack and attempts to see that as the return address. So, depending on what code it executes after the return, it can do a number of things.

Most of the time after the bug occurs, the interpreter limps along for a while until it hits a BRK instruction, $00. Then, that instruction causes the system to execute an interrupt. On the C64, the system vectors through $316-$317 (BRK vector) and does a warm start. On the C128 and PETs with Monitors, the system dumps into the internal machine language monitor. If the machine under use did not do something with the BRK vector, the machine will hang.

Note that the above is not the only result. Since the interpreter is executing code from the wrong location, any result from no effect to hung machine is possible. Also note that this is NOT normal behavior. The system should report an error while interpreting the above statement.

$0B1 The screen color RAM was changed to value 1 when the screen was cleared. Thus, when a byte was poked into screen RAM, the resulting character was white on the screen. The white contrasted nicely with the normal blue background.

$0B2 Commodore found that this practice sometimes caused "light flashes" during screen scrolls. I was going to leave this for another time, but here goes: the change was to make the color RAM equal to background color register #0. This got rid of the "light flashes", but then poking values to screen RAM caused invisible characters, since the foreground color of the character was the same as the background color of the screen.

This broke a number of older programs that did not properly initialize the color RAM. Also, Commodore fixed the problem with the VIC-II that had caused these "light flashes" So, Commodore changed the KERNAL a third time. Since the above change caused invisible characters, Commodore made a third revision that changed the color RAM to the value in location 646 (the current cursor foreground color).

$0B3 The text is actually "?ILLEGAL QUANTITY ERROR". Notice the two spaces between "QUANTITY" and "ERROR". John West supplies the explanation:

"The vector at $0300 points to a routine at $A43A, which is the general error message printing routine. Load .X with the number of the error, and it prints it. It looks up the address of the error text from a table, then prints the text, which does not have any trailing spaces. It then prints ' ERROR', with *2* spaces. It does this for all errors."

Historically, this effect is caused by the VIC-20, which only had 22 columns. When the VIC-20 BASIC was being ported from the PET BASIC code, someone noticed that the some of the error strings would span two VIC-20 lines. So, the BASIC error messages were changed a little, so that they all printed neatly on two lines: The PET error string:

?ILLEGAL QUANTITY ERROR (one space) became:
?ILLEGAL QUANTITY
ERROR (carriage return plus one space).

When the C64 BASIC was being ported from the VIC-20, the carriage return was replaced with a space character. I admit that this caught me by surprise. I have used Commodore computers for years, and never noticed that "?SYNTAX ERROR" had 2 spaces in it.

$0B4 Since OS/9 was a real-time operating system for the 6809 microprocessor, it was available on only one Commodore machine, which had two different names: The Commodore SuperPET. The machine was sold as the "MMF (Micro MainFrame) 9000 in Germany, and its model number was SP9000.

$0B5 There were a number of answers to this question, and there may be more:

1) The Commodore C16. Commodore decided to cut out telecommunications, and thus designed the user port out of the computer, as the modem is the only use Commodore ever made of the user port. This also includes the C116, a version of the C16 with a chicklet keyboard.

2) The Commodore Ultimax/MAX machine. This was the ill-fated game console produced in the early 80s. It was basically a stripped down Commodore 64.

3) The 64 GS (Game System). This machine was another flop produced in the late 80s.

$0B6 6.

$0B7

No#	Name		Description	
01)	accumulator		asl	a
02)	immediate		lda	#$00
03)	zero page	lda	$00	
04)	zero page,X		lda	$00,X
05)	zero page,Y		lda	$00,Y
06)	absolute		lda	$1000
07)	absolute,X		lda	$1000,X
08)	absolute,Y		lda	$1000,Y
09)	implied		clc	
10)	relative		bne	
11)	(indirect,X)		lda	($00,X)
12)	(indirect),Y		lda	($00),Y
13)	(absolute indirect)	jmp	($1000)	

$0B8 According to the 8050 User Manual, a sequential file could be 521208 bytes in size.

$0B9 16 characters.

$0BA 40 pins.

$0BB 24 pins.

$0BC Not Ready For Data.

$0BD $f8, SEt Decimal mode. Sets the D flag in the status flags byte. Although used rarely, this opcode switches on Binary Coded Decimal mode. In BCD mode, the byte $10 is treated as 10, not 16. The add and subtract instructions are the only legal ones affected by this mode, although some undocumented/illegal opcodes are also affected. For example, in this mode, adding the byte $15 (21) to the byte $25 (37) yields $40 (64) not $3a (58). remember that, in this mode, $40 = 40, not 64.

$0BE Most differing series of Commodore computers had different places for the start of BASIC programs. For instance, on the C64, $0801 (2049) is the start of BASIC memory, but most PET computers start BASIC memory at $0401 (1025). This wouldn't matter, except BASIC programs are stored on tape and disk with the start address, and the line links in a BASIC program have absolute addresses in them. To fix these problems, the Commodore VIC-20 and newer computers came out with a "relocatable load". Here are the two choices:

1) Save the program on the PET as: save "name",X (X is device). Then you could load the program into the non-PET machine by using a relocatable load: load "name",X. This would load the program in at start of BASIC memory and refigure the line links.

2) Redefine start of BASIC memory on non-PET machine. A couple of pokes to relevant BASIC pointers, and the start of BASIC was moved. Then, load the program non-relocatable.

From the above discussion, it looks like option 1 is the simplest route, except for one detail: earlier PET computers saved the BASIC program from $0400, not $0401 as is expected. The effect: loading relocatable on a non-PET would have a zero byte as the first byte of the program. The quick fix: change BASIC pointer to itself-1, load PET program, reset BASIC pointer. Commodore didn't make it easy!

$0BF Since the earlier PET computers did not have a "relocatable load", the only way to load a program from, say, a C64 into a 2001 was to use option #2 above and move the start of BASIC memory to $0801

ON THE HORIZON

COMMODORE AND COMPUTER INDUSTRY NEWS

New Game from Creative Pixels

Creative Pixels announces the release of a new game for the Commodore 64 entitled *The Ghost of Genghis Khan*. The new game is a mixture of storytelling and arcade action, in which a time portal sends the ghost of Khan back to his castle. A present day scientist, Dr. Helga Smith (a parapsychologist investigating the incident), is kidnapped by Khan. One or two players assume the role(s) of Keeper(s) of the Time and try to rescue Dr. Smith and send Khan back in time where he belongs.

The Ghost of Genghis Khan is the fifth game for the C-64 to be released by Creative Pixels. *Creative Pixels Ltd., P.O. Box 592, Library, PA 15129.*

Commodore Power User Newsletter Sweepstakes

Commodore Power User, or *CPU* for short, has recently announced a subscription drive in which they will award several prizes. *CPU* is a quarterly newsletter aimed at all levels of Commodore 64 and 128 users. The sweepstakes will close on July 1, 1996, and the prizes to be awarded include a CMD SuperCPU (Grand Prize), three CMD SmartTrack trackballs (Second Place), and eleven GEOS ScanART disks (Third Place). All prizes will be awarded, and *CPU* has placed advanced orders with CMD for the Grand and Second Place prizes, to be shipped directly from CMD to the winners. Subscription prices for six issues of *CPU* are $15.00 (US), $21.00 (Canada and Mexico) and $27.00 (overseas). For additional details, see the *CPU* ad in this issue. *CPU, P.O. Box 1817, Shelton, WA 98584.*

Underground Expanding

The Underground is getting bigger. As of the March/April 1996 issue, our format has expanded from the small size of 8-1/2 x 6-1/2" page to a full 8-1/2 x 11" page. Each issue will regularly run 20 of these larger pages, which would be equivalent to 40 of the smaller size. This move is to provide more space for articles, as well as present a professional format. Content will be the same quality you have come to expect in past issues, and there will be more of it.

Due to the larger size, more pages, and new source of reproduction, prices have risen slightly. Effective May 1, a U.S. subscription will be $13 for six issues per year, with sample issues for $2.50. For Canada and Mexico the new price is $15.75 per year, samples being $2.75. Subscriptions for International readers is $22.25. Prices for back issues will remain the same. All checks or money orders should be in U.S. funds.

We feel these new prices will allow us to produce a quality product, remain competitive, and continue to be an important voice in the Commodore community. Thanks for your continued support. *Contact: Scott Eggleston, Editor. the Underground, 4574 Via Santa Maria, Santa Maria, CA 93455. E-mail: underground@tcf.com.*

Changes at Threshold

Threshold Productions is now known as Threshold Productions International. The extension on the name is for legal reasons, there is another company using the same name which handles graphics and animations for various TV shows.

Our message number has also changed. The new number is (206)706-2231. Our previously listed phone number is now for private and non-business related calls only.

We will be shipping our first catalog very soon, and unlike other catalogs it will be disk based with playable preview versions of our titles. When requesting a catalog please include US $1.00 for shipping purposes. *Contact: Jonathan Mines, Threshold Productions International, 17730 15th NE, Suite #229, Seattle, WA 98155. Phone: (206)706-2231. E-mail: tpinfo@eskimo.com.*

Loadstar Compleats More

Loadstar has recently announce several more additions to their Compleat series, a line of software products that bring together programs and files with a common theme or author. New additions include *The Compleat Lee O.*, *The Compleat Crossword*, and *The Compleat Jon*.

The *Compleat Lee O.* is a collection of six productivity programs by Lee O. Clinton for the Commodore 128: *FUND ANALYZER, RESUME WRITER, PEDIGREE 128, AUTO EXPENSE, COOK'S HELPER* and *FIDUCIARY*. The disk costs $20.00, and is available in both 1541 (*#0032D5*) and 1581 (*#0017D3*) formats.

The Compleat Crossword brings together a collection of 220 crossword puzzles that have been published in Loadstar over the last eight years, and also features a new crossword presenter. Using the presenter, you can scroll through all of the available selections, mark puzzles which you have solved, and play one of nine songs in the background. The package is available on a 1581 disk (*#0020D3, $20.00*) or on two 1541 disks containing 110 puzzles each (*Comp Crossword 1, #0036D5, $10.00; Comp Crossword 2, #0037D5, $10.00*).

Lastly, *The Compleat Jon* incorporates eleven games from Loadstar's 'renaissance years' (1987—1990) written by Jon Mattson. The games have been updated to work on modern disk drives, and span a wide variety of categories, including role-playing, mazes, fantasy, and more. Price of the

Maurice Randall's 'CMD Chrysler' ARCA race car—you can bank on it.

package is $20.00, and it is available in both 1541 (*#0038D5*) and 1581 (*#0021D3*) disk formats.

For more information on Loadstar's Compleat series, call or write: *Loadstar, P.O. Box 30008, Shreveport, LA 71104. Phone: (318)221-8718. Orders: (800)594-3370.*

The CMD Chrysler On Display

A local branch of the First Of America Bank on Mt. Hope Road in Lansing, Michigan held a special promotion on a recent Friday while everyone was 'racing' to the bank to deposit their paychecks. The promotion was dubbed 'Race Day,' and on display out front was Maurice Randall's ARCA stock car.

Race Day was designed to promote the bank's direct deposit service for its customers. The slogan of the day was, "Why race to the bank when you can direct deposit?"

Posing along with the car (above) in front of the bank are the branch's employees. Other racing paraphernalia could also be seen inside the bank.

Maurice also had the car on display at the recent annual Lansing Area Computer Club EXPO, and indicated that he plans to campaign the car at selected ARCA races in 1996.

VIScorp to Acquire Amiga Technologies from ESCOM

Heppenheim, Germany and Chicago, IL, April 12, 1996—ESCOM AG, a German computer manufacturer and reseller and Visual Information Services Corp. (Nasdaq: VICP, Bulletin Board), a developer of interactive TV (ITV) set-top-boxes to enhance television use and viewing by providing Internet access and electronic communications function, today jointly announced that a binding letter of understanding has been signed between the companies.

The letter states that Chicago-based VIScorp would acquire Amiga Technologies, including the intellectual properties of the former Commodore Business Machines, excepted Commodore trademarks. The transaction value is approximately US $40 million. Terms were not disclosed, and the pending acquisition would be subject to approval by both companies' boards of directors.

"This intended acquisition is part of VIScorp's strategy to build market leadership in the fast-growing field of ITV", said William Buck, Chief Executive Officer. "As a result, we would own Amiga intellectual properties, including several that are currently used in our set top-box, Electronic Device (ED). We would also have control over the supplied chip sets used in ED as well as Amiga inventories and access to the company's current sales and distribution channels."

Commenting the proposed acquisition, Helmut Jost, chief executive of ESCOM AG, said: "VIScorp has a clear vision of the Amiga technology potential for ITV applications. We are eager to support and work together over the term of the letter of understanding to ensure a smooth transition between the two companies. VIScorp anticipates the support of ongoing European sales of popular models such as the A4000T and the A1200 as well as the current developments and future releases of Amiga Technologies."

Petro Tyschtschenko, president of Amiga Technologies stated "I am looking forward to being able to take advantage of the research and development support potential that an Amiga-related company like VIScorp can provide."

Commenting that the primary objective of the proposed acquisition is to give VIScorp full access to the Amiga technology to support development of its ITV device, Mr. Buck noted: "Our intention is to rapidly develop and begin manufacturing TV set-top interactive boxes—products that give home users capabilities such as telephone reception and dial up capabilities, facsimile, video games, pay-per-view options, electronic mail, and access to on-line services, including the Internet."

Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

Contact: Gilles Bourdin, Amiga Technologies, Berliner Ring 89, D-64625 Bensheim, Germany. Tel +49-6252-709-195. Fax +49-6252-709-520.

ERROR CORRECTION

Low IQ

Leading the errors in 'Lucky Issue 13' was an incorrect numbering of lines in the BASIC program INTELLIGENCE QUEST. We later discovered that the version we ported over for publication was corrupt, causing the incorrect line numbers. The range affected showed up as lines 3328 through 3578. These lines should be numbered 2560 through 2810, numbered in steps of 10 (2560, 2570, 2580, etc.). With the corrected line numbers, however, the CheckSum values given for these lines will no longer match. If you enter the lines initially with the published line numbers, you can check the CheckSum value, then edit the line number and delete the incorrectly numbered line.

Bad CheckSum

As if the problem with our IQ program weren't bad enough, we also managed to allow an error to creep into the only part of our CheckSum program that doesn't check itself. The final POKE command in line 250 should have read: `pokesa+26,165`. We've corrected this in the version that appears in this issue.

Just For Starters

by Jason Compton

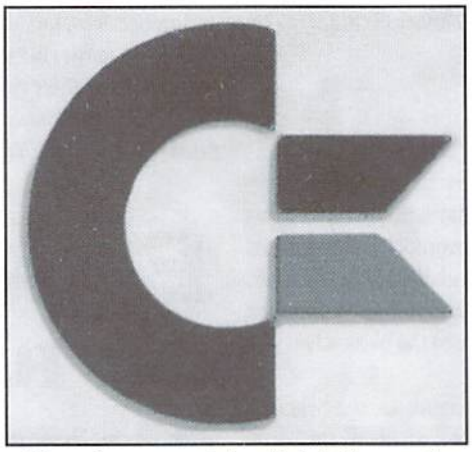
INPUT DEVICES

The primary tool for interacting with your Commodore is the one that sits out in front of you: the keyboard. While the keyboard has yet to be matched for such tasks as entering programs and inputting text, for many other applications such as games and navigating complex interfaces, it falls far short of the mark. A selection of alternative input devices are at your disposal to make these jobs easier, but not all are created equal, and some get tasks accomplished better than others.

Joysticks

Seems obvious, doesn't it? Joysticks are by far the most popular input device for the Commodore. In part because of the virtually full compatibility between the Commodore, Atari 8-bit and VCS, and Amiga joystick specification, and in part because of the large proliferation of games for the machine, there are countless different models of joysticks floating around out there.

Commodore joysticks are digital input devices, with 8 directions and a single fire button. The digital nature of Commodore joysticks means that there is only one degree of each direction that can be detected by the computer. Whether you push up firmly or softly, the signal sent by the joystick is exactly the same. Other computers, such as Apple machines and PC clones, use analog joysticks, where joysticks have a much greater range of movement and the computer recognizes the difference between pushing "a little to the left" as opposed to "strongly to the left."



The advantage of the digital Commodore standard is largely seen in certain types of games. On the whole, where fast action is required, a digital joystick's response is preferable to an analog. Games such as flight and automobile simulations, however, usually feel more lifelike and realistic with analog systems, where small corrections can be made easily.

Mice

While many people believe that the mouse emerged with Apple's Macintosh in 1984, the truth is the device was some two decades older, invented in the 1960's. Usually, mice are used in graphical user interfaces (GUIs) such as GEOS, but are supported by other utility interfaces as well as by the occasional game.

In GUIs, mice are used to move a pointer across the screen, and its buttons are used for highlighting text, selecting options, and moving data around. The user moves the mouse across a flat surface, as representation of where they want the pointer to go. Mice come with one, two, or three buttons; more usually being better, or at least more flexible. While under the most popular GUI, GEOS, only one button has any direct use (for selecting menus and menu items as well as interacting with data), the remaining buttons can be programmed for other purposes.

Just as joysticks come in two styles, so do mice. The first mouse to appear for the Commodore was the 1350. This was a digital mouse, which actually behaves exactly like a joystick. Instead of offering true proportional movement in 360 degrees, the 1350 merely sends the same eight directional signals that joysticks use. This means that while the device in your hand is different, the overall usefulness is the same. Then came the 1351, which introduced analog, or truly proportional, input. This allows, for example, the drawing of freehand curves in paint programs. Navigating GUIs is significantly easier when movement is not limited to eight directions.

Some time later came the SmartMouse. As far as the Commodore is concerned, it behaves as a 1351 does, but includes a battery-backed Real-Time Clock (something the computer itself lacks) and sports three buttons—one for conventional use, the second for a "double-click" action (Icons in GEOS must be clicked on twice in order for them to execute programs), and the third to increase the speed of the pointer across the screen. In addition, the SmartMouse can be switched into a joystick mode similar to the 1350. The Real-Time Clock option can come in

handy if you tire of manually correcting the GEOS clock, or you want to have an accurate date-stamp on your files and projects.

Using a mouse as a joystick can be effective if you are particularly comfortable with mice, but it can also be a serious hindrance. Mice are usually best suited for games where they are directly supported, like the Breakout-style Arkanoid. Mice are more productive in GUI roles, so you're better off tracking down a true proportional mouse such as the 1351 or SmartMouse if you're going to get serious about GEOS use.

Trackballs

Trackballs and mice are mechanically quite similar. A mouse works by moving a small plastic package, which contains a small rubber or plastic ball on its underside, across a flat surface, which spins the ball. This movement is read by the mouse's circuitry, translated into directional information, and sent along to the computer.

Trackballs, on the other hand, put the ball on the top. The trackball casing does not move, the user pushes the trackball itself in the direction desired, and that movement is interpreted and read by the computer. They come in digital and analog forms just like their mouse cousins.

As you might expect, digital trackballs function exactly like joysticks. Since trackballs were never wildly popular on the Commodore, the most memorable examples come from coin-operated arcade games such as Crystal Castles, Missile Command, and the classic head-to-head Football table game.

The only presently marketed trackball is the analog SmartTrack. The specifications on the SmartTrack match the SmartMouse exactly, from the real-time clock to the three buttons and their assignments to the joystick emulation option, but the trackball version is somewhat more expensive.

Trackballs actually have a certain advantage over mice and joysticks. Unlike a joystick, you can have proportional input. Unlike a mouse, you can never run out of room on your mouse pad or table, which happens more often than mouse users would like.

Touchpads

Touchpads are quite different in operation. Except for a button or two, there are no moving parts. Instead, the user presses on a sensitive pad with their finger or a with a special stylus. The pad sends out a signal indicating the point of pressure, and that signal is interpreted as a location on the screen.

For obvious reasons, touchpads are often used for drawing applications. Overall, touchpads never played a major role on the Commodore, but one touchpad manufacturer left a mark. The KoalaPad did quite well on a number of computer platforms, and KoalaPaint was one of the first high-quality drawing programs for the 64.

The KoalaPad is a device about the size of an average hardcover book, with an angled top. There are two large buttons used for selecting options, and a smallish square in the center of the pad about the size of a floppy disk. This is the touch sensitive area, where you actually "draw" what it is you intend to capture on the screen. The KoalaPaint format established its own standard image format that is still used to this day.

Touchpads can be great as drawing tools; after all, you can actually trace a real picture. The area available to you is not that large, and some detail can get lost as you draw. As general input devices, touchpads have virtually no acceptance. Consider them a special-purpose device.

Light Pens

As classes of input devices go, light pens are far more similar to touch pads than they are to joysticks or mice. Light pens have no moving parts and intend to simulate how people accomplish tasks on paper rather than requiring new techniques.

Light pens are used by pointing them directly at the screen. The tip of a light pen has a special photosensor which detects the position of the monitor's scanning beam. By keeping track of this beam, the computer knows exactly where the user is pointing the pen.

Also like the touchpad, light pens are first and foremost designed for and supported by drawing programs. But the GEOS 2.0 driver for the Inkwell Systems Light Pen (reviewed in this issue) is excellent, and in my opinion is the best implementation of GUI interaction I've ever encountered. Drawing directly on the screen is enjoyable and useful enough, but the GEOS interface with a light pen is infinitely more comfortable with a pen than with a joystick.

Like joysticks, light pens are well documented in the Commodore's hardware, and are quite easy to support in programs. Unfortunately, aside from GEOS and specialized software, very few programs actually allow for light pen input.

It's a foregone conclusion that just about everyone needs at least one joystick. Aside from playing games, plenty of programs allow the use of a joystick interface, which can be easier than pecking away at a keyboard. If you're going to get serious about painting or using a GUI such as GEOS, however, you may want to take a look at the options outlined here. Odds are, you will be able to find an input solution that you can be quite comfortable and happy with.

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Foreign Exchange

By Andrew Fisher

GAME TIPS FROM THE U.K.

As many of the current crop of games hail from Europe, we thought it would be interesting to get some game tips from one of the UK's top commodore game players. Andrew Fisher, reviewer and technical consultant for many magazines in the UK, reveals his tips to give you the advantage!

Heavenbound

I bet this was the first time you had ever seen a pink elephant when you were sober! This vertically-scrolling platform game features great graphics and infuriating gameplay. Every time you play, you seem to get a little further. There are a few simple tricks to master in order to help the lovable T-Fant, the pink elephant with a yearning for adventure, to reach the pearly gates.

When certain enemies are killed, they leave behind bonus coins. "B" gives you hihi, or improved jumps, while "S" gives you more shot power (which gradually reduces again as you lose lives). Most important of all is the "T" time bonus. You start with 60 seconds and gain another 99 whenever you pick up a T. Coins will remain in place until you collect them, so play tactically and leave a T coin behind until you really need it.

Learn How to "Jump-shoot"

This involves jumping and then shooting two or three times as you reach the top of your jump. This enables you to reach the clouds and platforms above, clearing all of the bad guys out of your way.

The platform layout is very complex, but there is one simple rule: when you fall, hold left or right until T-Fant hits the edge of the screen. You should fall safely onto the nearest platforms at the screen's edge. If you are an expert, learn where the clouds are and fall onto them instead.

You don't need to complete the game in one life. As you climb higher, you will re-start when you die at the nearest set of platforms (not on clouds). However, when you lose all your lives, it's back to the beginning.

At a couple of points along the way, you'll encounter big gray guys sitting on platforms and firing big lasers at you. Always use the "jump-shoot" technique, and make sure you stay out of their line of fire!

Watch out for the flame-breath of the little green demons, and the worms that pop up out of the ground. It's worth wasting a few seconds every time a new platform appears and watching where the enemies are.

And finally, there are several pairs of fast-moving clouds that can really catch the inexperienced player off guard. The movement of the cloud actually slides T-Fant along, often ending in an undignified fall from the edge. Practice makes perfect, so try jumping with the motion of the cloud. Some clouds don't move between two points; they might have a circular pattern, or give access to more than one platform.

Lions of the Universe

This fast-paced, shoot-em-up has got the lot; big enemies, lots of weapon upgrades, plus mind-blowing sound and graphics. Crucial to your success in this game is learning how to upgrade your weapons. Shooting the weapons pod will advance the symbol as follows:

blank	shield (lasts about 5 seconds)
arrow right	forward fire
arrow left	rear fire (get at least 2 upgrades)
double dots	vertical fire
parallelogram	diagonal fire (very important, I kid you not!)
double arrow	"spread" fire (builds into a wall of bullets)
"x"	upgrades mega-laser
circle	adds a circling drone with extra firepower (maximum of 2, but you can collect more—when you die, you'll keep them)

The cycle then repeats with a blank pod (shield) again. Recommended choice of weapons (from the four pods at the start) are a forward fire, rear fire, diagonal fire and spread fire. Then get another rear fire, an "x" to upgrade the mega-laser (see below) and more spread and vertical fire. Note that in the two-player mode the "circle" icon does not appear.

The mega-laser is crucial for destroying large formations, and is particularly effective against the big monsters. You have enough power for about 6-8 shots initially, and then it takes about 3-4 seconds to recharge each shot. The mega-laser is upgraded by collecting "x" weapon icons, going from a single bar to 3 bars to 5

bars, with each extra x making it more powerful. Practice taking out complete waves with the mega-laser.

As well as the weapons pods, there are two "super" blocks in the first level. The first type is an arrow and appears in the middle of a wave of enemies. Shoot the enemy in front and pick up the block. You'll get a shield and a speed-up which lasts 20-25 seconds. After the first big enemy, you'll come across another block which takes you into the asteroid bonus level. You won't die here because you get a shield. Shoot all the asteroids and you can earn up to 18,000 points, enough to give you at least one extra life.

The biggest threat is from aliens that attack from the rear. There are several waves on the first level, so get used to where they are and position yourself to deal with them effectively. With drones, you have a little more breathing space, as their firepower can take out the ships as they approach from behind.

Dealing with the first big pincer monster is straightforward. It fires three bullets; green ones from the outside guns, and then a red one from the center. To destroy it you need to keep firing at the middle gun (it flashes on screen to help you). Watch the movement of the pincer monster up and down, and line yourself up to hit the center without being hit. The quicker you can deal with this monster, the better!

Further on in the level, you'll come across more formidable enemies. You can work out what is vulnerable by shooting and watching to see if it flashes to indicate damage is being done.

The big monster in the middle of the level requires you to hit in the following order: top gun, bottom gun, mid-section. While you shoot at the outer guns, they fire back, as does the middle gun, and you also have to watch out for the big bullets chucked out of the enemy's center (there is a definite pattern; look for the safe spots between the outer guns and the middle).

If you make it into the "crucial" zone and survive the narrow corridors, watch out for the twin caterpillars (only one is vulnerable) before the big bad guy is loaded in. This is a dragon, but you can't attack it straight away. Use the mega-laser wisely to clear the gray troops equipped with missile launchers that run along the top and bottom of the screen (it's best to wait until two or three are visible on one surface, and aim to destroy them at once). When the missile launchers are dead, you attack the dragon by shooting its mouth. It retaliates with a fast-moving bullet that travels horizontally, and with four fireballs, so watch out! The fireballs home in on you, so try moving down and then quickly up again to avoid contact. Use the mega-laser and your ordinary firepower to hit the mouth, and you'll be greeted with a triumphant tune and a big explosion!

Skate or Die!

It's time to slam and jam with Electronic Arts amazing skateboarding game. Here are some quick tips for each event.

Half pipe: to get the highest possible score (approximately 22,000) you need to perform every maneuver once without falling. Do ollie airs and 720s over the channel (left hand side), railslide and plants on the right.

High jump: if you really want to beat this event, try using a gamepad rather than a joystick. If you want to show off, practice "tweaking" (pressing the fire button) just before the height readout stops moving, and you should gain an extra few inches.

Downhill race: for maximum points, try approaching the big pipe on the left and ducking all the way through. Go for some radical jumps onto and off the clubhouse steps, and if you're feeling brave, try jumping onto the islands in the middle of the pond.

Downhill jam: sneaky tactic #1 is to bash your opponent over and then accelerate away so he has to catch up. Kick and punch every can and bottle within your reach, and avoid going down the back garden (with its laundry lines). Finally, can you set off the police car's sirens?

Pool joust: beat up poseur Eddie a few times before you try taking on Lester. Better still, grab a friend and knock them around together! The key is lining up for a pass; a swift rail slide or moving up and down while airborne is essential. If your opponent has the boffing bar, go for speed! Lots of 720s and then slow up with a rail slide to confuse him. And never press fire until the last possible moment when carrying the bar. It's far too easy to think you have your opponent in your sights and to miss because you were too eager.

Laser Squad

Futuristic strategy at its best. Here are some general tips and then help on specific missions.

Always get at least grade 1 armor. In most scenarios, give your privates grade 2 and your corporals grade 3. If you are running out of ammo, don't forget that you can loot dead bodies (human bodies, of course) for extra weapons and ammo. Just make sure you change or reload as appropriate.

Your troops tire very quickly and enemies can creep up on you. Always leave at least half of your force on "opportunity fire" by spending no more than half their action points each turn.

Borrow some tactics from real-life marines! Appoint a heavily-armed and armored rear-end Charlie to cover the back, and at the point (the front) of your formation, make sure you have a weapon capable of automatic fire to get extra hits on the enemies as you encounter them.

Assassination (scenario 1) is best tackled from the deployment zone to the left of the "front door" of the main building. Tool up your corporals with lasers (or heavy laser) and a spare battery, give two privates marsec autoguns or m4000's, and take a rocket launcher with an extra rocket. You can wait until an enemy droid pops its head out of the door and then (with your troops at least 8 squares away) blast it with the rocket launcher.

Rescue From the Mines (scenario 3) is a tense, atmospheric fight through hostile conditions. Split your force between the top corners of the map, and carry at least 3 packs of explosives. Make sure you change, prime for at least 3 turns and then drop explosives right next to the door. (You can move the prisoners into the far corner of their cells to protect them). When you have rescued them, rush for the middle or creep back up the edges of the map to the lifts. No bonus points are awarded for blowing up bits of the map or killing enemy forces.

Sword of Honor

When the going gets tough, the tough get out their ninja swords and fight their way through! Combining the best elements of classic beat 'em-up games like the Last Ninja series and Barbarian 2, Sword of Honor is very tough to complete. The object is to reclaim the sword (and the royal families honor) from the ruler of northern Japan, who stole it from the ruler of southern Japan. Here are a few pointers.

Nearly every character in the game will attempt to speak to you, so read the text before you attack! There will be a verbal clue to an object you need to drop or trade in that location. As an example, get the fan from the house at the back of the first screen on level 1 and give it to the samurai outside the temple. He's too hot, so the fan will cool him down.

To exit level 1, you need to collect two buddha statues from the praying monks. Level 2 features a nasty fire-breathing dragon. There is a pattern to his flames. The sequence is 3 flames, 1 flame, 1 flame, 2 flames, 1 flame, 1 flame, 2 flames, 1 flame and then a long gap. Use the forward roll to either get through the doorway or pick up the object under the statue. You'll need to find and open trapdoors on levels 3 and 4. Objects you have in your possession may need to be left behind.

We hope these tips have helped assist you in your quest for success. Happy gaming!

Graphic Interpretation

by Steve Vander Ark

DO-IT-YOURSELF APPLICATIONS

Approximately a year ago, someone posted a note in the bulletin board section of the Geoworks RoundTable on Genie which stuck with me. That RoundTable is devoted to the version of GEOS which runs on IBM-compatible computers. The IBM version of the GEOS operating system, referred to generally as PC-GEOS, is almost as orphaned as Commodore GEOS. By that I mean that while there are still plenty of folks using the system, there are few new programs being written for it.

Essentially, the message in the Geoworks RoundTable said was that in response to the lack of new applications for PC-GEOS, that other users who were very familiar with the GEOS software, should create "templates" for those existing programs which would function almost as new applications. What that person suggested was that new and powerful programs with exciting capabilities didn't have to be created from scratch. Many such programs could instead be created using the tools provided with geoFile, geoCalc, and so on. That message was really the impetus for the column I wrote last issue in which I described a new "pseudo application" I created for GEOS using geoFile and a few desk accessories. This time around, I'm going to expand on that idea a little, and hopefully spark some ideas from all you GEOS users out there who wish for new software which isn't materializing.

First, let me remind you of the process I went through last issue, so that if you missed that column, you'll know I'm talking about. I was faced with the need for a program for GEOS which would function as a scheduler and time manager, as well as a place to collect information.

This type of program is extremely helpful for anyone who needs to keep track of things like phone numbers and lists of things to do at their desk. There is no software available for GEOS to handle this task directly, so I set about creating what I needed using geoFile. I created a screen-sized form which provided me with spaces for my schedule, space for "Things to-do" lists, and other information. The sorting capabilities of geoFile allowed me to create a new form for each day to schedule in advance for projects. I added the calendar and the notepad desk accessories, along with geoDex to handle actually making calls. I mentioned that I used geoWizard to quickly task switch between geoWrite, which is where I spend most of my actual working time in GEOS, and my new "pseudo application."

This issue, let's step back and look at what actually happened there. There was no application to satisfy the need I had, so I created one of my own. The "authoring tool" I used wasn't geoBASIC or geoProgrammer. Instead, I used the power of the existing programs, in this case geoFile, Calendar, geoDex, geoWizard, and the NotePad. The functionality of my new "program" was borrowed from the capabilities of those programs. In the end, I had the application I needed, custom designed for my own needs. Did it do everything I wanted? Unfortunately not. I didn't have quite all the power I needed. A "real," full-powered scheduler would still be a great new application for some GEOS programming whiz to work on. But my "pseudo application" certainly satisfied my basic requirements.

I can imagine other "pseudo applications," or pseudo-apps. Here's an example: I have a friend who has constructed an ingenious spreadsheet with which to create characters for role player games. There are other ways to use spreadsheets. How about a money management program? There isn't a GEOS version of the Sylvia Porter financial software Timeworks used to sell, but couldn't someone create a powerful geoCalc spreadsheet that would make tracking your finances a lot easier? Sections of the grid could be filled in with explanatory text, making the form easy for anyone to use. In much the same way, geoFile templates could be specially designed for things like home inventory or geoWrite templates for business forms. Folks who are proficient at using these basic programs could create pseudo-apps that would fill some of the gaps in available GEOS programs.

Wait a second, you say. That isn't anything special. You're just talking about using geoCalc and geoWrite and geoFile in the way they were intended. There's nothing so unique about this idea. Creating a spreadsheet for, say, managing a checking account isn't radical; that's what geoCalc is for, for Pete's sake!

Okay, I hear you. So call them templates instead of pseudo-apps. Maybe you have been doing this all along. The point is in what you do with them after you create them. While you might have no trouble creating a checking account register using geoCalc, a lot of other users (including me) would find that task a formidable one. They wouldn't care to wrestle with the details or put in the time necessary to make a geoCalc file that worked well. And that's where someone's nifty geoCalc template, when shared with the rest of the GEOS community, becomes a lot more than just a template. It becomes almost a new application for other users: a pseudo-app.

I hope that a light is dawning. Maybe you've spent a lot of time creating various business forms using geoWrite or maybe you have designed a schedule planner like the one I talked about earlier. I would love to see some of these pseudo-apps being uploaded to places like Genie. I did a quick check and found a couple of them already in Genie's libraries. There were geoCalc templates for tracking expenses and for baseball statistics. For geoFile, I found templates for genealogy work and for keeping track of a video library. Those are great, but there could be a lot more. Just think of the power even those few templates add to GEOS. They turn the basic programs into specialized software; pseudo-apps to replace independent applications which are probably never going to be written. With the creative possibilities of geoWrite, geoPublish, geoCalc, geoFile, and geoPaint, anyone can design a new and powerful tool for other GEOS users to enjoy.

While we're on the subject of creative uses of GEOS programs, let me toss another idea out to you. This came to me when I was at a meeting of third grade teachers from my area. As we talked, everyone handed out copies of their school curriculum guides for third grade. A curriculum guide, as you might imagine from the name, is a list of what teachers are expected to teach at each grade level. It would be unfortunate if a teacher prepared a whole unit about weather, for example, only to find out that the kids spent three weeks learning about weather the year before. At some point, someone has to sort out all this kind of thing. This kind of organization is essential and pretty much basic for a school system.

At my meeting, just about everyone's curriculum guide looked the same. Each had apparently been typed on a word processor in outline form and laser printed. A couple of them were laid out as a chart, with something of a standard form from page to page; each subject had a section for text books, for field trips, literature tie-ins, and so on. These forms were also created on a word processor. But one of the guides was very different. It was a chart

constructed in the form of a grid, with details typed into the spaces. It had been created using a spreadsheet.

If you're like me, when you think of spreadsheets you think of numbers. A curriculum guide involves absolutely no number crunching at all. But once I looked over this particular guide, I could easily see why someone had chosen to use a spreadsheet instead of a word processor to make it. After all, a curriculum guide is essentially a big chart, with headings for various subject areas and sub-headings for things like books used and topics covered; down the side of the chart are the grade levels. And a spreadsheet is like a big, blank chart, ready to be filled in.

So you can make charts with geoPaint or geoPublish, and you can simulate one pretty easily in geoWrite. By printing geoFile records packed on a page, you could even create something similar with your database. But a geoCalc spreadsheet has the advantage in this case. With its built-in grid of lines and the fact that you can type text into any of the spaces as easily as numbers, the spreadsheet has most of the formatting already up and running when you start. You don't have to make a bunch of horizontal and vertical lines or try to line up text boxes inside of the spaces. The lines are there and you can't put text anywhere except in the spaces in a spreadsheet. Also, like a database form, you can use it as a template to make new or specialized versions of the form.

Over the last few years, I have spent a lot of time trying to make forms for my classroom with geoPublish. I've also made lists and outlines with geoWrite, using tabs and other things to organize things. Now, when I think about it, I can see that if I would have just fired up geoCalc, I could have saved myself a lot of time and effort. I didn't consider geoCalc at all, of course, because I was stuck with the traditional, narrow concept of what a spreadsheet was for. Now that I've stretched my thinking and let myself see new ways of using old tools, GEOS has become a much more powerful and exciting world in which to work.

Now you can probably see where all this is heading. I'm coming back around to what I started with; that little scheduler I created in my last column. That was another example of the same kind of new, expanded thinking about old tools. In the case of my scheduler pseudo-app, I had let go of my limited view that a database was for collections of phone numbers or personal data, to be stored away and searched every so often. Instead, I used the database screen as a blank form to be shaped into anything I wanted. In the same way, when I use geoCalc to create a curriculum guide for my third grade, I look at that grid as a blank form to be shaped into whatever type of chart or table or form I need.

I can use any application for creating charts, tables, and pseudo-applications of the kind we've been looking at. The only difference is in the inherent capabilities of each basic application: the database gives me search and sort capabilities; the spreadsheet offers an easy to use, pre-constructed grid; the word processor offers enhanced text capabilities; and the graphics programs have graphics tools to knock your socks off. Each one, however, can be used to create new and exciting GEOS tools, tools which will each expand the GEOS universe a little more.

CROSS-PLATFORM FILE TRANSFERS

PART ONE: NULL-MODEM TRANSFERS

by Doug Cotton

For several years now I've commonly transferred files between systems on a daily basis, to the point that it seems almost second-nature to do so. For those of you who are less familiar with the concept, "cross-platform file transfers" are exactly what that phrase purports them to be: the moving of files between computers of different types.

For many users this probably seems like some strange and magical rite, reserved only for those with the ability to recite the correct incantations. I can assure you, this isn't the case, and nearly anyone can learn to successfully transfer their files, given the proper equipment and knowledge.

Now, for those of you who are wondering just why anyone would want to bother with taking files from their Commodore to another computer system (or vice versa), consider any of a number of scenarios:

- you have a Commodore at home, and you need access to some of your files from work where you use a different platform
- you have a Commodore at home, and you want to print some files on a laser printer at your office or other remote location
- you have both a Commodore and some other platform machine at home, and you want to swap files between the two to take advantage of specific capabilities you use on each

And there are a great many more possibilities. But regardless of the reason, what you really want to know is how to go about getting the files transferred. Hopefully, by the time you finish reading this article, you'll know what's necessary to transfer files successfully.

What we need to consider first are the various methods used for file transfers, and how each of these apply to differing needs and equipment. So we'll begin by taking a closer look at these.

Null-Modem Transfers

Now, before you misunderstand this first method, don't read too much into the heading above: you won't need a modem of any type to perform this kind of transfer.

What you will need is a special cable, called a null-modem cable, and you'll also need some kind of RS-232 interface for your Commodore. Before we get into the details of the hardware, though, let's try to get a general understanding of this method of transfers.

Null-modem transfers involve using a cable to directly connect two computers together. In order to do this, the two computers involved need to be within a reasonable proximity of each other. I've personally used this method with computers that have been up to 40 feet from each other, but I've talked to others who have had even longer runs. Once you've connected the two computers together, you have a configuration which somewhat mimics using actual modems to connect computers (more on that later), but without connecting them through telephone lines.

And just like a true modem connection, you'll need to use terminal software to get the computers to actually talk to each other. One of the main features of a terminal program is to send characters typed into one machine to the other machine. Once there, the characters are displayed on the screen. But more importantly, terminal programs also contain file transfer functions that let you send or receive files directly from one machine to the other. Thus, by creating a direct null-modem connection between computers and by using terminal programs on each, you can easily transfer files between the two.

Now that you've got the general picture of how these transfers are done, let's look at what you actually need to make it happen.

First off, both computers must be equipped with an RS-232 (serial) port. These are common on most computers—except the Commodore! So you'll need an RS-232 interface to make this work. In this case, I very much recommend SwiftLink. I know... I work for the company that makes this device, so I must be biased, right? But frankly, SwiftLink is the most commonly available RS-232 interface around, offers high speed, and comes supplied with some decent terminal programs for both the C-64 and C-128.

Next, you'll need a null-modem cable. These are available from almost any computer dealer, even Radio Shack has them (but don't let some less-than knowledgeable salesman sell you a cable that doesn't specifically state on the package that it is a null-modem cable!). Be careful in picking this out—you'll need to study the connector on your RS-232 interface and that of the serial port on your 'other' computer so that the cable you get will match up properly.

Now you need terminal software. My recommendations are Novaterm 9.5 for the 64, and Dialogue 128 for the 128, but others will work. I do, however, recommend these particular programs because both support hardware flow control, which can make high-speed transfers more reliable. Novaterm comes with SwiftLink, though it is shareware, and you should definitely pay the author his shareware fee if you plan to use it; Dialogue 128, though, is a commercial program, so you'll need to buy that separately.

Don't forget your 'other' machine: it needs a terminal program as well. If you're using an MS-DOS machine without Windows™, your best bet is probably ProComm. It's a little convoluted, but it's widely supported. Windows comes with a terminal program, called Terminal (how original!). It's a bit mundane, and not very fast, but the price is right. For Macintosh users, I'd suggest Zterm; it's a very complete shareware program with a decent user interface. Amiga folks... well, the last Amiga terminal I used was Baud Bandit, and I didn't care for it much, but it worked. There are probably better choices, though, so check with other users.

Okay, so now you have everything you need to tie your computers together and start transferring files. So, where to start?

Get the hardware hooked up... RS-232 interface plugged into your Commodore, then attach the null-modem cable to that with the other end connected to your other computer. Now start up the terminal programs for both machines (you can do either one first, the order doesn't really matter here).

Once you have the terminal programs up and running, you need to get them configured with the same parameters before they can 'talk' to each other successfully. This means you'll need to become at least familiar enough with those program to be able to find the various configuration sections. The things you'll need to match up right away are the baud rate, parity, stop bits, flow control (handshaking), and terminal emulation.

To start off, select a baud rate. If you're using a slow RS-232 interface on the user port of your Commodore, you won't be able to go above 2400 baud on the 64, 4800 or 9600 on the 128, depending on the terminal program you're using. I'd just start with 1200 at first, just to make sure that everything works—you can kick it up later. Set both terminal programs for this baud rate. Also, set the data bits to 8, parity to none (no parity) and stop bits to 1.

Now you need to set the flow control, or handshaking. If you're using a user port RS-232 interface, it may not support hardware handshaking, and your best bet is to set this for XON/XOFF. If you're using a SwiftLink and the terminal programs you're using both support hardware or RTS/CTS (or CTS/RTS) handshaking, then this is the better choice.

Finally, you need to set the terminal type, or terminal emulation as some programs call it. Most terminal programs will have an ASCII mode, or alternately, a VT-100 or VT-102 mode. You can generally mix and match these specific modes without problems. You should also try to locate

the setting for Echo or Local Echo. Turn this option on—without it, you normally won't be able to see what you type.

Now that you have everything set up, the first thing you need to do is put both of the terminal programs into their main terminal mode, then type something on the keyboard of one of the two computers. Provided you did everything else correctly, what you type should show up on the screen of the other computer. If this doesn't happen, then go over all the connections and program settings to see if you can isolate the problem.

Assuming that you've got things working, enter some text from the other computer to make sure that everything works okay in both directions. Once you've determined that both machines are transmitting and receiving correctly, you can step the baud rate up. In most cases, you'll want to use the fastest rate possible with your particular hardware and software to reduce the amount of time it takes to transfer files.

Now you're ready to transfer a file. To do this, you'll need to select a file to send, and a protocol to use for sending it. This is done by going to the upload (or send file) section on the sending computer—you'll need to experiment or study the terminal program documentation to find out the specifics. Likewise, you need to select the same protocol from the download (or receive file) section on the receiving computer. I'd suggest using Ymodem Batch (or Ymodem 1K) protocol for your transfers, because this allows you to send several files, and will usually take care of sending the file names as well. Also, when sending PETASCII files to some other computer, or when receiving standard ASCII files on your Commodore, you'll probably want to enable the ASCII translation function of your terminal program (provided it has that function).

Well, I'm definitely out of room for this issue, but we'll continue next time with a look at some of the other transfer methods.

Tools for Transfers

LOCATION	HARDWARE	SOFTWARE	NOTES
Both computers in the same location	Null-modem cable, RS-232 interface	Terminal software on both computers	Computers are interconnected via null-modem cable, transfer files with terminal programs using xmodem, ymodem, or text buffer capture. Can transfer between any computer types.
	64NET cable	64NET	Computers are connected via special cable to create a network. Special software is operated on both computers to achieve transfers. Only for MS-DOS/Commodore transfers.
Computers are in same or different locations	C64S cable	C64S Emulator	Connects 1541 drive to MS-DOS computer via special cable. Transfer using utility included with C64S or other utilities such as TRANS64.
	A64 cable	A64 Emulator	Connects 1541 drive to Amiga computer via special cable. Transfer using utility included with A64.
	x1541 cable, 1541 drive	Special utility program running on MS-DOS PC (TRANS64, THE STAR COMMANDER, etc.)	Connects 1541 drive to MS-DOS computer via special cable. Transfer using special utilities such as TRANS64.
	1571, 1581 or CMD FD	BIG BLUE READER LITTLE RED READER	Directly read or write MS-DOS diskettes with Commodore 64/128 using one of the supported drives.
Computers are in different locations	Modem	Terminal Software	Computers are connected through modems via standard telephone lines. Transfer files with terminal programs using xmodem, ymodem, or text buffer capture. Can transfer between any computer types.

HTML and the WEB

PART III

By Katherine Nelson of Amiga Report Magazine

This is the last in our three part series on HTML documents and Web authoring. This issue, we finish up with an overview of CGI and using CGI with forms, and then list a couple of places to visit on the net for when you are just visiting, rather than writing HTML.

A CGI Overview

CGI, which stands for Common Gateway Interface, allows you to attach just about any data or program to your home page. These CGI programs can be written in two different ways. The first is by writing a script in perl, a shell scripting language, or anything else amenable to your server. This tends to be the preferred method because it tends to be easier to learn scripting, and easier to debug. For more complicated CGI programs (or just for personal preference), you may instead use C, C++, or other programming language as well. This type of CGI program must be compiled first into an executable, while is an extra step beyond the scripts that are executed as-is.

In general, if your server is set up well, there should be several CGI programs available to you already in the "cgi-bin" directory on the server machine. This directory should be aliased to allow you access from the main directory. If you wish to add your own programs, you need either very high access on the server, or a good relationship with someone who does. If your server has a "webmaster", then that is the person to go to with your home-brewed CGI programs, or for advice on establishing your page with complex CGI applications.

CGI and Forms

CGI programs can add interactive aspects to your forms. You can use a form as a front-end for a search program for a database, or you can use CGI to manage a survey you conduct on a web page, or whatever else you can think of.

In order to use the data in a form, the CGI program must decode the information sent to it. For a form sent by the GET method, an environment variable called QUERY_STRING contains the information in name=value pairs that are separated by ampersands. Also, spaces have been converted to '+' signs, and special characters have been converted to their hexadecimal code values. If you feel a bit squeamish (or lazy) about decoding this information, there are several scripts available that will do this for you. Check your favorite archive or use a search utility such as Lycos or Yahoo to find one that suits you.

Decoding forms submitted with the method POST is a bit more complicated, but again, there are utilities available to do it for you. QUERY_STRING no longer holds the query data, and is now is a null value instead. The environment variable CONTENT_LENGTH now holds the length in bytes of the query information, which is now located in the standard input. This data is then accessed like any other standard input (which will vary depending on the language you are writing the CGI program in). Once you have the data, you will have to further decode it in the same manner you decode a QUERY_STRING above. The name=value pairs need to be separated and the spaces and special characters converted.

If you are not sure which method will be used to send data to your program, you can check the environment variable REQUEST_METHOD, which will hold the value GET or POST.

In order to send information back to the client program, you simply send each line of the document through standard output (for example, many scripting languages use the command 'echo'). The document must be preceded, however, by some header information. Most of the header is optional, but one line that must be included is the content type. This header is sent to the client the same way the rest of the document is. The actual header itself that must be sent is 'Content-TYPE: text/html'. Use quote marks only if the language you are using requires them. A blank line should be sent immediately after. Then the rest of the document can follow, and it may contain any HTML tags you desire, as long as they are sent properly.

Internet Sites to Visit

Now that you know how to create a respectable home page, it is time to explore other sites. Every good surf begins with a search. Here are a few search engines to use:

```
http://www.altavista.digital.com/
http://www.lycos.com/
http://www.yahoo.com/
http://webcrawler.com/
```

Now for some Commodore 64 specific sites, try:

```
http://www.the-spa.com/cmd/cwhome.html
http://www.msen.com/~brain/cbmhome.html
http://www.nada.kth.se/~d93-alo/c64/links.html
http://studl.tuwien.ac.at/~e9426444/geoswarp/
```

These should be enough to get you started. These are by no means the only Commodore 64 pages out there. There are a ton more! But these are pretty good starting points.

Armed with the knowledge from the past few months, you should be reasonably well prepared to stake your own claim on a little corner of the Web. Creating a basic web page is the start of establishing electronic immortality, and it all starts with some free time and a good text editor. Get to work, and enjoy surfing!

User Group Connection

Looking for a Commodore user group in your area? User groups can help you solve problems, keep you informed of new products and events that might be of interest, and give you a chance to share your computing experiences with others who enjoy Commodore computing. **The following are confirmed groups and verified addresses, registered with *Commodore World*.**

ALABAMA

Birmingham Commodore Club, P.O. Box 59564, Birmingham, AL 35259 -9564
H.A.C.K.S., P.O. Box 14356, Huntsville, AL 35815-4356

ALASKA

Anchorage Commodore User's Group, P.O. Box 104615, Anchorage, AK 99510-4615
Sitka Commodore User's Group, P.O. Box 2204, Sitka, AK 99835-2204

ARIZONA

Arizona Commodore Users Group, P.O. Box 27201, Tempe, AZ 85285-7201
Busy-Bee User Group, 3 Paseo Cuacha de Toro, Arivaca, AZ 85601
Catalina Commodore Computer Club, Inc., P.O. Box 32548, Tucson AZ 85751-2548

ARKANSAS

Northwest Arkansas C.U.G., P.O. Box 2925, Fayetteville, AR 72702-2925

CALIFORNIA

C-128 West User's Group, 17047 Devanah St., Covina, CA 91722
Club 64, P.O. Box 514, Patton, CA 92369
Commodore Technical User's Group, 2231 E. Trenton Ave., Orange, CA 92667
Central Coast Commodore User's Group, 3896 Berwyn Dr., Santa Maria, CA 93455
Diablo Valley Commodore User's Group, 1896-D Lynnwood Rd., Concord, CA 94520
The Fresno Sixty-Fourum, P.O. Box 16098, Fresno, CA 93755
FUNHUG, 814 Valley Run, Hercules, CA 94547-1440
Haywood C.U.G., 4586 Glenn St., Freemont, CA 94536
Hub Area Commodore Club, 7127 Arrowhead Trail, Browns Valley, CA 95918-9630
Lake County Computer Users, 7827 Evergreen Dr., Kelseyville, CA 95451
Orange County Commodore Club, c/o 439-102 Fair Dr., Costa Mesa, CA 92626
South Bay Commodore User's Group, P.O. Box 1176, Redondo Beach, CA 90278
Southern California C.U.G., 2059 Cedar Ave., #11, Long Beach, CA 90806-4616
Southeast San Diego C-64 User's Group, 258 Euclid Ave. #B, San Diego, CA 92114-3640

COLORADO

FC C3, 1713 Valley Forge Ave., Ft. Collins, CO 80526
Front Range Commodore Club, P.O. Box 272, Niwot, CO, 80544-0272
Western Slope Commodore User Group, P.O. Box 81, Mack, CO 81525-0081

CONNECTICUT

Capital Region Commodore Computer Club, P.O. Box 2372, Vernon, CT 06066
Fairfiled County C.U.G., P.O. Box 212, Danbury, CT 06813

DELEWARE

First State Commodore Club, P.O. Box 1313, Dover, DE 19903

FLORIDA

Commodore Computer Club of Jacksonville, 141 Mango Court, Middleburg, FL 32068
Commodore User's Group of Venice, P.O. Box 3325, Venice, FL 34293
Comm. U. G. of South West Florida, P.O. Box 7692, Ft. Myers, FL 33911
El-Shift-Oh, Inc., P.O. Box 361348, Melbourne, FL 32936-1348
Gainesville Commodore User's Group, P.O. Box 90212, Gainesville, FL 32607
Lakeland C.C.C., 111 Eau Claire, Auburndale, FL 33823
M.I.C.E., 11110 Bird Road, Miami, FL 33165-4417
Manasota Commodore User's Group, P.O. Box 698, Oneco, FL 34264 -6618
Naples Area C.U.G., 10701 Rogers Ln., Bonita Springs, FL 33923
Polk Area C.C.C., 4845 Fleetwood St., Lake Wales, FL 33853
Port Orange Commodore User's Group, 52 Windward Crt., Port Orange, FL 32127
Stuart Area Commodore, P.O. Box 1446, Port Salerno, FL 33492
Tampa Commodore User's Group, 5002 Halifax Dr., Tampa FL 33615-4628
Titusville Commodore Club, 890 Alford St., Titusville, FL 32796

HAWAII

Commodore Hawaii User's Group, c/o M.N. Daniels, 46-329 Kumoo Loop, Kaneohe, HI 96744-3532

IOWA

Commo-Hawk Commodore User's Group, P.O. Box 2724, Cedar Rapids, IA 52406-2724
Commodore User's Group, Ames Region, P.O. Box 2302, Ames, IA 50010-2302

ILLINOIS

Blooming-Normal CUG, P.O. Box 1058, Bloomington, IL 61702-1058
Champaign-Urbana C.U.G., 2010 W. William, Champaign, IL 61821
East Side Computer Club, P.O. Box 276, Godfrey, IL 62035
Fox Valley 64 User's Group, P.O. Box 28, North Aurora, IL 60542
Illinois Commodore Users, 1108 W. Violet Dr., McHenry, IL 60050-8061
Sandwich Computer User Group, P.O. Box 23, Sandwich, IL 60548-002
S.W.R.A.P. User's Group, P.O. Box 528232, Chicago, IL 60652-8232
SouthEastern Illinois C.C., 818 East Main St., Olney, IL 62450

INDIANA

Midwest Computer Users Group, P.O. Box 9311, Highland, IN 46322

KANSAS

Commodore Users of Wichita, 6606 Cottonwood, Wichita, KS 67207
Topeka Commodore C.U.G., P.O. Box 8439, Topeka, KS 66608

KENTUCKY

Gold City Computer Users Group, P.O. Box 257, Fort Knox, KY 40121
Louisville Users of Commodore of Kentucky, P.O. Box 9551, Louisville, KY 40209-0551

LOUISIANA

Acadiana Commodore Computer Club, 416 Dale St., Lafeyette, LA 70501
New Orleans Commodore Klub-64/128, P.O. Box 1997, Metaire, LA 70004-1997

MARYLAND

ABCUG, P.O. Box 179, Glen Burnie, MD 21060-0179
A.C.U.G., P.O. Box 3358, Annapolis, MD 21403

MASSACHUSETTS

Boston Computer Society Commodore SIG, 101 First Ave., Suite 2, Waltham, MA 02154
Commodore Computer Club Of The Berkshires, 38 Walden Lane, Pittsfield, MA 01201
Pioneer Valley Commodore Club, 6 Laurel Terrace, Westfield, MA 01085

MICHIGAN

Down River Commodore Group, P.O. Box 1277, Southgate, MI 48195
Lansing Area Commodore Club, P.O. Box 1065, E. Lansing, MI 48826
Michigan Commodore User's Group, 800 Lloyd, Madison Heights, MI 48071-1915
Muskegon Area C.U.G., P.O. Box 4496, Muskegon Hts., MI 49444
Saginaw Area C.U.G., P.O. Box 2393, Saginaw, MI 48605-2393

MISSOURI

Computers North Users Group, P.O. Box 34534, North Kansas City, MO 64116-0934
Commodore User's Group of Kansas City, P.O. Box 36034, Kansas City, MO 64111
CUGSL, P.O. Box 837, Bridgeton, MO 63044
MDC/RCC-Commodore SIG, P.O. Box 34088, St. Louis, MO 63134-4088

NEVADA

Clark County Commodore Computer Club, P.O. Box 28136, Las Vegas, NV 89102

NEW HAMPSHIRE

Concord-Manchester CUG, c/o W. Beers, 174 Liberty Hill Rd., Bedford, NH 03110

NEW JERSEY

C.E.B.U.G, P.O. Box 314, East Brunswick, NJ 08816
Info 64 Users Group, c/o 186 Delmar Avenue, Glen Rock, NJ 07452

NEW YORK

Brentwood Commodore Computer Club, c/o Public Library, 2nd & 4th St., Brentwood, NY 11711
Bronx User's Group, P.O. Box 523, Bronx, NY 10475
Hudson Valley Commodore Club, c/o 620 Plainfield St., Kingston, NY 12401
Mohawk Valley C.U.G., P.O. Box 343, Tribes Hill, NY 12177-0343
Northern NY Commodore Home Users Group, c/o 6 Garden St., Pottsdam, NY 13662
Queens Commodore User's Group, P.O. Box 129, Queens, NY 11417
Tri-City Commodore User's Group, P.O. Box 12742, Albany, NY 12212

OHIO

Ashtabula County Commodore User's Group, c/o 1527 Elmwood Dr., Ashtabula, OH 44004
Basic Bits Commodore Group, P.O. Box 81886, Cleveland, OH 44181-0886
Central Ohio C.U.G., P.O. Box 28229, Columbus, OH 43228-8229
Cincinnati Commodore Computer Club, 5575 Pleasant Hill Rd., Milford, OH 45150
Commodore Computer Club of Toledo, P.O. Box 13011, Toledo, OH 43613
Dayton Area Commodore User's Group, c/o 1748 Lanbury Dr., Dayton, OH 5439
Erie Bay C.U.G., P.O. Box 1461, Sandusky, OH 44870-1461
Shelby C.U.G., P.O. Box 512, Shelby, OH 44875

OKLAHOMA

Commodore User's Group of Lawton, P.O. Box 3392, Lawton, OK 73502
Commodore Users of Bartlesville, 1920 Santa Fe, Bartlesville, OK 74003

Tulsa Area Commodore User's Group, P.O. Box 52473, Tulsa, OK 74152-0473

OREGON

Amiga Commodore User's Group, 623 29th St., Astoria, OR 97103
Commodore User's Association, P.O. Box 84, Medford, OR 97501
Coos Computer Club, 2175 Everett, North Bend, OR 97459
Lane County Commodore User's Group, P.O. Box 11316, Eugene, OR 97440
Milwaukie Community Computer Club, 3902 SE 28th Place, Portland, OR 97202-3512
Vancouver Commodore Users Group, c/o David Erickson, 15859 S.E. Brenda Ave., Milwaukie, OR 97267

PENNSYLVANIA

Harrisburg Area Computer Club, 721 S. 29th St., Harrisburg, PA 17111
Lehigh Valley C.U.G., 931 Lawrence Dr., Emmaus, PA 18049
Main Line Commodore User's Group, 1046 General Allen Ln., West Chester, PA 19382
Philadelphia Area Computer Society, c/o LaSalle University, Philadelphia, PA 19141
Pittsburgh Commodore Group, P.O. Box 16126, Pittsburgh, PA 15242

SOUTH DAKOTA

Sioux Empire Commodore Club, 1932 S. Menlo Ave., Sioux Falls, SD 57105-2717

TENNESEE

Memphis Commodore User Club, P.O. Box 34095, Memphis, TN 38134

TEXAS

Commodore Houston User's Group, P.O. Box 441252, Houston, TX 77244-1252
Commodore Users of San Antonio Texas, P.O. Box 380732, San Antonio, TX 78280
Meeting 64/128 Users Through the Mail, Route 7, Box 7614, Palestine, TX 75801
Metroplex Commodore Comp. Grp., P.O. Box 813, Bedford, TX 76095
North Dallas C.U.G., c/o 1522 Bitter Creek, Garland, TX 75040

UTAH

Mountain Computer Society, c/o 3898 Cheryl St., Salt Lake City, UT 84119

VERMONT

Champlain Valley Commodore User's Group, 6 Mayfair St., S. Burlington, VT 05043

VIRGINIA

Fredericksburg Commodore Club, 6803 Teal Court, Spotsylvania, VA 22553
Peninsula Commodore User's Group, c/o W.L. Philips, P.O. Box 11293, Newport News, VA 23601-9293
Russell Fork Commodore Club, HC1, Box 790, Birchleaf, VA 24220

WASHINGTON

Commodore Bellingham User's Group, 3368 N. State Road 20, #15, Oak Harbor, WA 98277
Commodore Users Of Puget Sound, P.O. Box 1806, Silverdal, WA 98383-1806
Spokane Commodore User's Grp, P.O. Box 474, Mead, WA 99021-0474
Tri-City Commodore Computer Club, P.O. Box 224, Richland, WA 99352-0224
University of Washington CCUG, c/o 12614 6th Ave., NW, Seattle, WA 98177
U.P.C.H.U.G, P.O. Box 11191, Tacoma, WA 98411-1191

WEST VIRGINIA

Commodore Home User's Group, 81 Lynwood Ave., Wheeling, WV 26003

WYOMING

Cheyenne Assoc. of Computer Enthusiasts, P.O. Box 1733, Cheyenne, WY 82003-1733

AUSTRALIA

ACT8CC, 1 Kitson Place, Florey, ACT 2615, Australia
Albury/Wodonga CUG, P.O. Box 1014, Albury, NSW 2640, Australia
C-64/128 Club of NSW, P.O. Box 244, Warilla, NSW 2528, Australia
C-64 Developments, P.O. Box 150, Unanderra NSW 3128, Australia
Hills 64 Group, P.O. Box 537, Cockatoo VIC. 3781, Australia
Melbourne CUG, P.O. Box 177, Box Hill, Vic. 3128, Australia
Woombug 8-Bit, P.O. Box 213, Woombye, QLD 4559, Australia

CANADA

Calgary Commodore User Group, c/o 427 5th Ave., SE, High River, AB T1V 1H9, Canada
Commodore Users of Edmonton, 9550-83 St., Edmonton, Alberta T6C-3A1, Canada
Hamilton Commodore Users Group, 35-1400 Limeridge Rd., East, Hamilton, Ontario L8W-1L7, Canada
Ottawa Home Computer Club, 1743 Caminiti Cresent, Orleans, Ontario K4A-1M2, Canada
Toronto PET Users Group, 5334 Yonge St., Box 116, Willowdale, Ontario M2N 6M2, Canada
True North 64 Diehards, c/o 2712 Tetrault St., Terrace, BC V8G 2W8, Canada

NETHERLANDS

Crystal Software & Electonics Nederland, c/o A. deVries, Leemveld 158, 9407 GE, ASSEN, The Netherlands

NEW ZEALAND

Kapiti Commodore Users' Group, 23 Weggery Dr., Waikanae, New Zealand

User Group Connection

The following are known user groups, however, the existence and addresses of the groups were not verified, although attempts were made by *Commodore World* to do so. If you can verify that any of these groups are still in operation, or if you have information on address changes, etc., please help your fellow Commodore users, and send them to us at *CW*. Thank you.

ALASKA

Commodore/Amiga User's Group, 2597 Boulder Ave., North Pole, AK 99705

ALABAMA

Chattanooga Commodore User's Group Inc., P.O. Box 271, Bryant, AL 35958-0271

ARIZONA

Commodore Club South, P.O. Box 324, Pinson, AZ 85126
C.O.U.G.A.R., P.O. Box 21291, Phoenix, AZ 85036-1291
Havasu Commodore User's Group, 61 Keywester Dr., Lake Havasu City, AZ 86403
Prescott Area Commodore Club, P.O. Box 4019 , Prescott, AZ 86301-4019
Thunder Mountain User's Group, P.O. Box 1796, Sierra Vista, AZ 85636-1796
Valley 128 User's Group, P.O. Box 21063, Phoenix, AZ 85036-1063
Valley One Twenty Eight User Group, P.O. Box 9641, Scottsdale, AZ 85252-9641

ARKANSAS

Hot Springs Commodore User's Group, P.O. Box 3692, Hot Springs, AR 71914-3692
Program Commodore Computer Club, P.O. Box 6000, Fort Smith, AR 72906-6000
Triple-D 64, P.O. Box 301, Reyno, AR 72462-0301

CALIFORNIA

A.B.A.C.U.S., P.O. Box 40334, Bakersfield, CA 93384
A.S.C.I. , 6160 Malvern Ave., Rancho Cucamonga, CA 91701
Barstow Commodore User Group, 1733 Sunset St., Barstow, CA 92311
C West Bay Area Commodore/Amiga User Group, 1564 Waller #B, San Francisco, CA 94117
C.A.C.T.U.S., 1626 N. Wilson Ave., Upland, CA 91786
Civic 64/128, P.O. Box 2442, Oxnard, CA 93034-2442
Coastline Commodore Club, 20311 Ravenwood Ln., Huntington Beach, CA 92646
Commodore Connection Users Group, P.O. Box 2851, Antioch, CA 94509-2851
Commodore Commodore Hayward User Group, P.O. Box 2072, San Leandro, CA 94577
Commodore Helpers of Long Beach, 3736 Myrtle Ave., Long Beach, CA 90807
Commodore System User Network, C/O 3894 Jupiter Ave., Lompoc, CA 93436-1904
Fairfield Commodore User's Group, P.O. Box 2778, Fairfield, CA 94533-2778
FOG International User's Group, P.O. Box 3474, Daly City, CA 94015-3474
Hughes Aircraft Company Commodore User's Club, Bldg. S-12, Mail stop 322, P.O. Box 92919, Los Angeles, CA 90009
Humboldt Commodore User's Group, P.O. Box 6502, Eureka, CA 95502-6502
Los Angeles County Commodore Club, 5947 Reno Ave., Temple City, CA 91780
Monterey Bay Commodore User's Group, 921 Tower Place, Santa Cruz, CA 95062-4118
Mother Lode, P.O. Box 1286, San Andreas, CA 95249-1286
Nappa Vally Computer Club, P.O. Box 2324, Napa, CA 94558-2324
North Bay User's Group, P.O. Box 7156, Vallejo, CA 94590-7156
North Orange County Computer Club, P.O. Box 3616, Orange, CA 92665
Oceana-64 Commodore User Group, 1004 Plover Way, Oceanside, CA 92057
Petcetera-On The Air, 525 Crestlake Dr., San Francisco, CA 94132
Plus/4 User's Group, P.O. Box 1001, Monterey, CA 93942-1001
Santa Rosa Commodore User's Group, P.O. Box 5830, Santa Rosa, CA 95402-5830
S.O.C.K., 25401 Champlain Rd., Laguna Hills, CA 92653
The Software Palace, 8978 Megan Ave., West Hills, CA 91304
South Bay Commodore User's Group, P.O. Box 1899, Chula Vista, CA 92012-1899
Stockton Commodore User's Group, 714 East Oak St., Stockton, CA 95202
64/More, P.O. Box 612794, San Jose, CA 95161-2794
Valley CC Newsletter, P.O. Box 310, Denair, CA 95316-0310

COLORADO

Colorado Commodore Computer Club, 1192 S. Nome, Aurora, CO 80012
Softwords Commodore Club, P.O. Box 25851, Colorado Springs, CO 80936

CONNECTICUT

Hartford County Commodore User Group, 182-J Homestead St., Manchester, CT 06040-3042
Stamford Area Commodore Society, P.O. Box 2122, Stamford, CT 06906

DELEWARE

Lower Delaware Computer Club, Box 5344, Nassau, DE 19969

FLORIDA

Clearwater Commodore Club, P.O. Box 11211, Clearwater, FL 34616-1211
Commodore Computer Club, 6956 Maudin Ln., Jacksonville, FL 32244
Commodore Country Club, 9125 US 19 North, Pinellas Park, FL 34666
Commodore User's Group of Pensacola, P.O. Box 36367, Pensacola, FL 32516-6367
Dinosaur 64, C/O Robin Tate, P.O. Box 9202, Masaryktown, FL 34609-9202
Lake/Sumter User's Group, P.O. Box 416, Leesburg, FL 34749
New Users, 3013 S.W. 11th St., Ft. Lauderdale, FL 33312

GEORGIA

Albany Commordore Amateur Computerists User Group, P.O. Box 5461, Albany, GA 31706-5461

IOWA

CCUGI of Des Moines, P.O. Box 35502, Des Moines, IA 50315-5502
Cedar Valley Commodore User's Group, P.O. Box 2254, Waterloo, IA 50704-2254
Northeast Iowa Amiga User's Group, P.O. Box 241, Cedar Falls, IA 50613-0241
Plymouth County Commodore User's Group, 508 First St. SW, LeMars, IA 51031
Product Engineering Center Commodore Users, 319 Ivanhoe Rd., Waterloo, IA 50701
TSCUG, P.O. Box 546, Dubuque, IA 52001-0546
QCCCC, P.O. Box 3994, Davenport, IA 52808-3994

IDAHO

Banana Belt Commodore User's Group, P.O. Box 1272, Lewiston, ID 83501-1272
Boise Area Commodore User's Group, 3213 N. Kelly Way, Boise, ID 83704
PFP 64/Amiga Software Exchange, 860 Sherwood #306, Boise, ID 83202

ILLINOIS

Canton Area Commodore Users Group, P.O. Box 61, Canton, IL 61520-0061
Commodore Byte, 3871 Leeward Ln., Hanover Park, IL 60103
Commodore Club of Rockford, P.O. Box 10022, Rockford, IL 61131-0022
Commodore Computer Connection, Box 82, Richview, IL 62877
Decatur Commodore User's Group, P.O. Box 2752, Decatur, IL 62526-2752
Fox Valley Commodore User's Group, 833 Prospect, Elgin, IL 60120
Jacksonville Area Commodore Users, 4 Purcell St., P.O. Box 135, Murrayville, IL 62668-0135
Kankakee River Vally Computer Users Group, Attn: Ronald Green, RR1 Box 29, Piper City, IL 60959
Knox Commodore Club, P.O. Box 494, Galesburg, IL 61402-0494
McHenry County Commodore Computer Club, 227 East Terra Cotta Ave., Crystal Lake, IL 60014
McHenry County Commodore Computer Club, c/o Lyle Giese, 913 West Ave., Woodstock, IL 60098
Micro-Bytes, 2548 S. Kenilworth, Berwyn, IL 60402
Peoria Area Commodore User's Group, 2508 N. Rockwood Rd. , Peoria, IL 61604
Peoria Area Commodore User's Group, 3330 W. Farmington Rd., Peoria, IL 61604
Sandwich Computer User's Group, P.O. Box 345, Sandwich, IL 60548
S.P.U.G. Computer Club, P.O. Box 9035, Springfield, IL 62791
Suburban Commodore User's Group, Box 40, Westmont, IL 60559-0040
Survivors Of The Sixty-Four Users Group, P.O. Box 6108, Macomb, IL 61455-6108
U.N.C.L.E., 533 N. 4th Ave., DesPlaines, IL 60016
Western Illinois Programmers, RR5, Box 75, Quincy, IL 62301

INDIANA

Anderson Computer User's Group, 830 Harold St., Anderson, IN 46013
Commodore Computer Club of Evansville, 819 Treelone Dr., Newburgh, IN 47630
Com-Net, P.O. Box 161, Vevay, IN 47043-0161
Logansport Computer Club, P.O. Box 1161, Logansport, IN 47043-1161
Richmond Area Computer User's Group, P.O. Box 1332, Richmond, IN 47375-1332

KENTUCKY

Bowling Green Commodore Users Group, c/o 1052 Castle Heights Rd., Bowling Green, KY 42103
Commodore Owners of Owensboro KY, 3807 Krystal Ln., Owensboro, KY 42303

LOUISIANA

B.R.A.C.E., P.O. Box 1422, Baton Rouge, LA 70821

MASSACHUSETTS

Northeast Computer User's Group, 24 Pineneedle St., Chelmsford, MA 01824

Worcester Area Com-Rades, 35 Hilltop Ave., Jefferson, MA 01522

MARYLAND

Commodore Users Group, 505 Marcia Ln., Rockville, MD 20851
Hagerstown User's Group, 953 W. Washington St., Hagerstown, MD 21740
NIST Commodore User's Group , 8 Cross Ridge Court, Germantown, MD 20874
Westinghouse Commodore User's Group, P.O. Box 8756, Baltimore, MD 21240-8756
WICOMICO Commodore User's Group, 11423 Back Creek Rd., Bishopville, MD 21813

MAINE

Commodore Users Group of Coastal Maine, RT 2 Box 3254, Bowdoinham, ME 04008
Commodore Users Society of Penobscot, University of Maine at Orono, 101 Crosby Hall, Orono, ME 04469
Your Users Group, P.O. Box 1924, N. Windham, ME 04062

MICHIGAN

Bay de Noc Geos User's Group, c/o Tom Fairchild, 916 Minneapolis Ave., Gladstone, MI 49837
Commodore Operators of Marysville Pt. Huron, 4579 Lake Shore Rd., Pt. Huron, MI 48060
Commodore User's Group of Michiana, 1525 Clarendon St., Niles, MI 49120
Lenawee Commodore User's Group, 210 Chestnut St., Adrian, MI 49221
Midland Computer Club, 4702 Jefferson Ave., Midland, MI 48640
Traverse Area Commodore Club, P.O. Box 1, Rodney, MI 49342

MISSOURI

Columbia Commodore Users, P.O. Box 7633, Columbia, MO 65205
Commodore User's Group of Springfield, P.O. Box 607, Springfield, MO 65801-0607
Hartland Users Group, P.O. Box 281, Cape Giraudeau, MO 63702-0281
The Southeast Missouri Commodore User's Group, P.O. Box 615, Farmington, MO 63640-0615

MISSISSIPPI

Coastline Commodore Computer Club, P.O. Box 114, Biloxi, MS 39533-0114

MONTANA

Miles City 64/128 User's Group, 700 South Prairie, Miles City, MT 59301
Missoula Commodore User's Group, P.O. Box 3331, Missoula, MT 59806-3331

NEBRASKA

Alliance Commodore Computer Club, 607 Toluca, Alliance, NE 69301
Greater Omaha Commodore User's Group, P.O. Box 241155, Omaha, NE 68124
Kearney Area Commodore Computer Klub, P.O. Box 1611, Kearney, NE 68848-1611
Lincoln Commodore User's Group, 5742 Saylor, Lincoln, NE 68506
Mid-Nebraska Users of Commodores, 1920 North Huston Ave., Grand Island, NE 68803
Micro Guerrilla News, 1006 W. 2nd St., McCook, NE 69001

NORTH DAKOTA

The Computer Club, P.O. Box 5521, Bismarck, ND 58502-5521

NORTH CAROLINA

CTUG/NC, 321 Hooker Rd., Lot #2, Wilmington, NC 28401
Sandhills Computer Club, 250 Oakmont Cir., Pinehurst, NC 28374
Triad Commodore User's Group, P.O. Box 10833, Greensboro, NC 27404-0833

NEW HAMPSHIRE

The Chain Gang, 11 Park Rd., Tilton, NH 03276
Commodore Help And Information Network, P.O. Box 654, Laconia, NH 03247-0654
Seacoast Commodore User's Group, P.O. Box 511, Durham, NH 03824-0511

NEW MEXICO

Commodore User's Group of Roswell, 1619 N. Kansas Ave., Roswell, NM 88201
Deming Commodore User's Group, 1400 Mallery St., Deming, NM 88030
New Mexico Commodore User's Group, P.O. Box 37127, Albuquerque, NM 87176-7127
Southern NM Commodore User's Group, P.O. Box 4437, University Park, NM 88003-4437

OHIO

Akron Area Commodore User's Group, P.O. Box 9293, Akron, OH 44305-9293
Canton/Alliance/Massilon User's Group, P.O. Box 2423, North Canton, OH 44720-2423
COM-NET, P.O. Box 390, Woodsfield, OH 43793-0390
Mahoning Valley Commodore Club, P.O. Box 1180, Youngstown, OH 44501-1180
? Syntax Error, 2040 Turnbull Rd., Dayton, OH 45431
Trumbull Commodore User's Group, P.O. Box 8632, Warren, OH 44484-8632

OKLAHOMA

Commodore User's Group of Altus, P.O. Box 701, Altus, OK 73522-0701
Midcontinent Mail Group, 10309 Caton Place, Midwest City, OK 73130
Stillwater Computer Society, 3124 N. Lincoln, Stillwater, OK 74075

OREGON

CRASH-64, P.O. Box 241, Salem, OR 97308

NEW JERSEY

Garden State User's Group, 89 Stratford Rd., Tinton Falls, NJ 07724
D.E.B.U.G., 713 2nd St., Dunellen, NJ 08812

NEW YORK

Brooklyn Commodore User's Group, 1735 E. 13th St., Apt 7N, Brooklyn, NY 11229
C.U.G.O.R, P.O. Box 23463, Rochester, NY 14692-3463
Folklife Terminal Club, Box 555, Coop City Station, Bronx, NY 10475
Morrisonville Commodore User's Group, Rt.1, Box 61, Morrisonville, NY 12962

PENNSYLVANIA

Blue Juniata Commodore User's Group, 28 Oakland Ave., Lewiston, PA 17044
Buxmont Computer User's Group, 1206 Cowpath Rd., Hatfield, PA 19440
Capital Area Commodore Club, P.O. Box 309, Grantville, PA 17028-0309
Centre Area C.C.C., 1104 S. Atherton St., State College, PA 16801
Commodore Users of Lebanon County, P.O. Box 511, Richland, PA 17087-0511
EPA Commodore User's Group, 1712 Aidenn Laire Rd., Dresher, PA 19025
Lower Bucks User's Group, P.O. Box 397, Croydon, PA 19020-0397
North Coast Commodore User's Group, P.O. Box 6117, Erie, PA 16512-6117
West Branch Commodore User's Group, 1111 Franklin St., Williamsport, PA 17701

SOUTH DAKOTA

Port 64, P.O. Box 1191, Rapid City, SD 57709-1191

TENNESEE

Chattanooga Commodore Users, 1406 Blackwell Dr., Chattanooga, TN 37412
Clarksville Commodore User's Group, P.O. Box 2171, Clarksville, TN 37042-2171

TEXAS

Abilene Cursor Control, P.O. Box 6261, Abilene, TX 79608-6261
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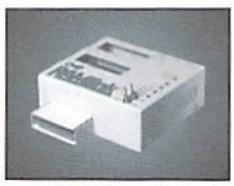

RAMLink

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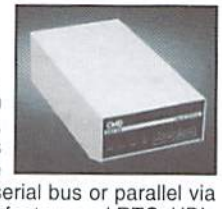

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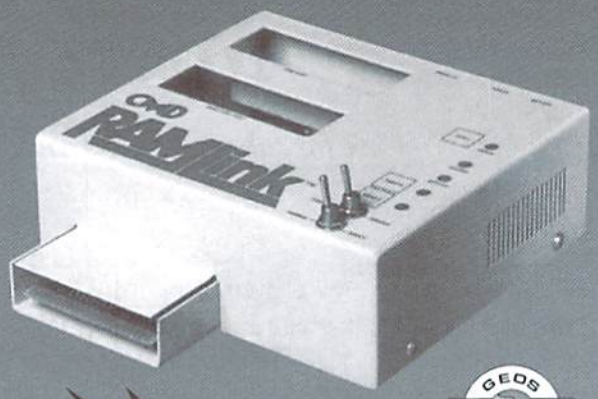

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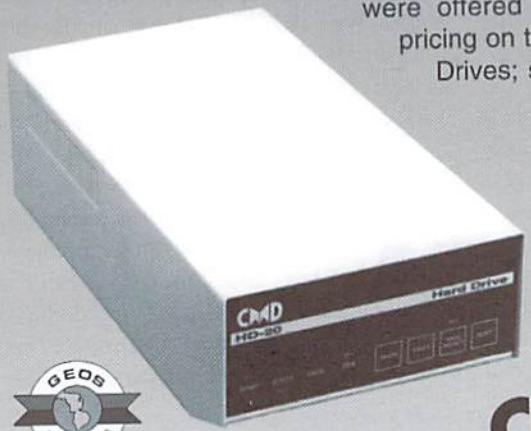

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CMD Creative Micro Designs, Inc.

HARDWARE IN REVIEW

RAMLink

Imagine a device that can provide battery backup for your Commodore 17XX REU, GEORam, or CMD RAMDrive. Further imagine the same device providing up to an additional 16 megabytes of expansion RAM storage. Collectively, you can utilize all that RAM just like a Commodore REU or a GEORam device, or load and save files to the memory as if it were a large disk drive. To do the latter, you need not mess with loading RAMDOS. In addition, the device provides its own copy of Creative Micro Designs famed JiffyDOS disk enhancement system. Add in a real time clock, GEOS support, and a pass-through expansion port to round out the sketch. If you can imagine that much, you are beginning to envision a CMD RAMLink expansion system. I call it that because it is not simply a RAM expander. The unit's RAM expansion capabilities are but a small part of its features.

Now, with the image of this unit still fresh in your mind, let me warn you that you haven't got the full picture yet; you are far from picturing the complete power of the CMD RAMLink. It is best to describe the features of the RAMLink from the simplest to the most complex. With that in mind, we shall begin.

The RAMLink unit is a metal encased printed circuit board that plugs into the expansion port of a C64, C64C, C128, or C128D. The unit is slightly wider than a Commodore REU, and about the same depth. The case stands about 2 inches tall, and is color matched to the C64C/C128 case color. The top of the unit contains two expansion ports. One is labeled RAM PORT, while the other is labeled PASS-THRU PORT. Switches include a master reset switch, an enable/disable switch, SWAP8 and SWAP9 switches, and a NORMAL/DIRECT switch. The last switch is used to determine the behavior of the RAM cartridge in the RAM PORT. Indicators include an error LED, an access LED, an activity LED, and two SWAP LEDs. The back of the unit sports an HD parallel port, a power supply connector, and a battery connector.

To use the unit, 64 users and some 128 users must install a small jumper inside their computer and plug that jumper into the RAMLink. Insert the unit into the expansion port, plug any RAM cartridge into the RAM-PORT, flip the switches to ENABLE and NORMAL and power up the computer. After a short wait, the familiar startup screen will come up. Initially, the RAMLink is assigned device 16, but can be changed to any number from 8 to 29. Using the RAMLink is as simple as using any other disk drive. However, a definite speed improvement will be seen.

The simplest use of the RAMLink is to turn your Commodore 17XX series REU or GEORam cartridge into non-volatile device (keeps data after power is removed). In fact, that in itself is a good use for a RAMLink, usually referred to as an RL. However, with your REU or GEORam installed into the RL, the units can be accessed as regular drives with regular CBM DOS commands. Leave your copy of RAMDOS sitting in the disk box. An RL has its own RAM DOS code, and the RL DOS doesn't have to be loaded before it can be used.

To move a step up, an RL allows the user to install an internal daughtercard, called a RAMCard, with up to 16 megabytes of RAM. The RAM can be either 1 MB or 4MB SIMMs (Single Inline Memory Modules), the type of memory used in newer IBM PC clone systems. The RAMCard accepts either 8 or 9 bit SIMMs, so the user need not worry about which kind to buy. SIMMs can either be installed by CMD or by the user. This added memory can be accessed like expansion RAM (á la CBM REU) or as one or more RAM floppy drives. In addition, this memory is battery backed as well, making it look just like a large REU or GEORam.

As is customary for CMD products, the RL has an option to provide a real time clock. If you own a CMD hard drive, the RL contains a special parallel port to allow faster access to the CMD HD. If you are familiar with either a CMD floppy drive or hard drive, rest assured that all the DOS commands are included. The RL supports subdirectories, time and date stamping, and can create 1541, 71, and 1581 emulation style partitions for those programs expecting a particular drive layout. Compatibility is excellent, as the DOS contains the same routines found in CMD's popular JiffyDOS system. The unit contains both a port to insert your additional RAM unit (REU, GEORam, RAMDrive), as well as a pass-through port for cartridges like

SwiftLink. CMD's innovative SWAP switches are present on the unit, allowing the user an easy way to exchange the RL with either device 8 or 9. This allows use of programs that will only save data files on those devices.

The ability to utilize both cartridge and RAMCard RAM as a non-volatile disk drive is a great boon to users who require fast access to data and programs. There is no need to determine the optimal settings for RAMDOS, and the RL can already take advantage of suitably modified expanded RAM cartridges. So, your 1 MB REU will be fully utilized within RAMLink. Describing the various disk operations available is not possible in this review, but some of the most useful include subdirectory support and time stamping of files. The sheer speed of the unit in retrieving files rivals that of RAMDOS on a Commodore REU, and compatibility with programs is better than RAMDOS. As an added bonus, the RL contains the ability to autoboot programs. There's nothing like powering on your machine and having it go directly to your favorite program.

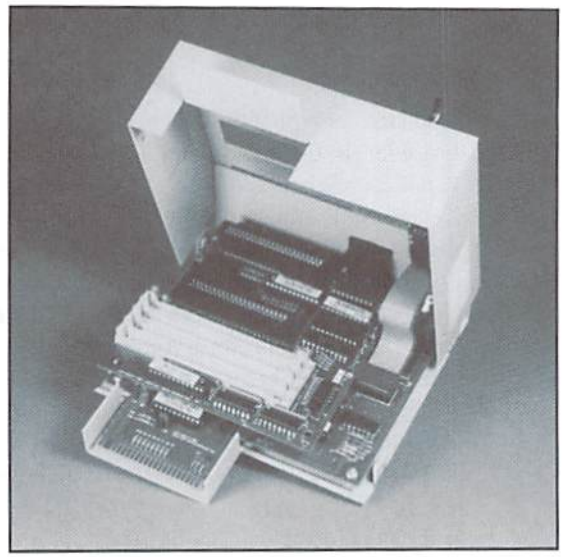
GEOS users will particularly appreciate the usefulness of the RL. The disk based operating system environment gains significantly speed when using the RL for temporary swap space and program overlays. Navigation through data files stored on the RL under GEOS is also many times faster. In fact, no serious GEOS user should be without the RL, as the main complaint about GEOS has always been speed, and the RL solves much of this problem.

As is customary, I cracked the unit open for a good look-see. As usual, CMD produces a clean board design with minimal revisions. All of the ICs are labeled, and the RAMCard sits snugly atop a connector and a standoff. The switches and LEDs are mounted on a separate board attached to the top half of the enclosure. In short, CMD did not disappoint me with this design.

As stated before, general compatibility as a disk drive is a bit better than RAMDOS or other approaches. Even if it wasn't, the ability to access files immediately upon boot-up has its advantages. Those looking for an REU should continue looking, because the RL cannot emulate an REU. For those programs that require an REU for expanded memory, only an REU or REU clone (like the 1750 Clone) will work. Thankfully, such programs are rare, and the RL does allow access of the REU directly while it is inserted into the RL. This allows the user to both utilize programs requiring the REU and utilize the REU as a disk drive when in other applications.

There's little to dislike with the RAMLink. As usual, the CMD unit packs in a lot of features and that can make navigation a bit hard. If you feel a bit overwhelmed by the options available, don't worry. CMD has included a set of utilities that will help you get things up and running with the least amount of hassle. Some options are used infrequently, so users can learn those as they are needed.

You can call me a nitpicker if you want, but I do have a few issues with the RL. I'll let you decide whether they are worthy of mention or not. The battery tops my list of concerns about the product. Very little mention is made about the battery unit and its potential hazards. Sure, most people understand batteries supply power and can be a hazard, but this battery is much larger than your average 1.5 volt penliet and contains substantially more chemicals and such inside. There are some directions written on the battery itself, but I feel mention should be made of where and how the battery should be placed in the midst of the user's computer equipment. Also of concern are the battery terminals, which are only partially covered by insulating terminals. Again, you may think me paranoid, but computer engineers know what a bit of electricity can do. Also, you can never over-estimate where those batteries will be placed. Although I think a battery enclosure would be the best solution, it is also the most expensive. So, maybe a warning and a bit more diligence in insulating those terminals would suffice.



While we're on the subject of the manual, let me state that I found the information very thorough and easy to read, However, those requiring technical assistance might have a time of it, as CMD suggests Q-Link, a now defunct online service, as one way to contact them. Although much of the RL manual is timeless, a quick change to remove Q-Link will probably save at least a few new users some grief.

In the more esoteric department, I found that in exercising the SWAP8 and SWAP9 buttons on the RL, I had to TURN OFF SWAP8 and then TURN ON SWAP9 to change the device from 8 to 9. Moving from 9 to 8 requires similar work. While not a major concern, it can be annoying, and it seems a bit non-intuitive to get from 8 or 9, or 9 to 8. Many people may never use those switches, but I actually found this out while in a real-world scenario.

As a user who works on a computer desk where the keyboard can be pushed under the monitor, the top-mounted ports of the RL make life a bit tough. While the RL itself doesn't rise above the height of the C64 keyboard, inserting an REU increases the height significantly. I now stare at my computer screen over the top of the REU. I can't help but wonder why a back port wasn't created. In fact, moving one of the top ports to the back and allowing users to select which port was used for what would have allowed the most flexibility. Users with expansion port expanders could put the REU in the top and the expander in the back, while REU users with just one cartridge or those with height constraints could put the REU in back. As I can't believe CMD didn't think of this, I suppose cost prevented such a design. Those with cartridge expanders will have to experiment.

My final concern doesn't really involve the RL, but rather its use. Although the RL can be used by many, some programmers need access to the RL as expansion RAM. Although CMD goes into some detail on how to use the RL in this manner, I would like to see CMD create and detail a memory allocation system for programmers to use or sanction an existing one, like the one in Craig Bruce's ACE. With the upcoming release of the SuperCPU, more applications will be looking for expansion memory, and creating a framework for the programmers would be a great help.

All nitpicking aside, I see the RAMLink as a very useful product. As stated earlier, serious GEOS users should definitely get one, and programmers will find their work much easier with one present. As with all products, it has its "quirks" (a word I found in the RL manual, no less) and isn't compatible with everything, but it does not disappoint in either regard. While I have a few concerns about programming and the battery, I'd still recommend that the Commodore enthusiast at least look into the RL's features.

- Jim Brain

SOFTWARE IN REVIEW

Inkwell Systems' Light Pen and companion graphics software programs

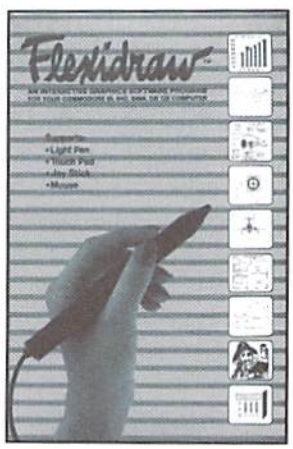
Volumes could be written about the astounding foresight of the Commodore hardware designers. Among the many nice considerations built into the C-64 lie the registers devoted to keeping track of a light pen.

Prophecies such as leaving a couple of light pen registers lying about tend to be self-fulfilling, and it didn't take long for someone to build a device to suit the purpose. For over ten years, Inkwell Systems has built and improved upon the concept of the light pen as an input device for the C-64, and a number of important applications have followed suit.

Without overcomplicating the issue, here is a brief explanation of the principles behind the light pen: Video displays are accomplished by a beam which sweeps across the screen line by line; sixty times per second in North America or fifty in Europe. The 64 keeps track of the exact pixel location of the beam at all times. The light pen picks up this beam as it crosses the "eye" (the photoelectric sensor) and relays a signal through the joystick port to the 64. The 64 reads this signal and makes a note of the position of the beam at the time the light pen. Implemented in software, this allows you to use the light pen as a flexible and versatile input device; for painting, for selecting items in a menu, or for navigating a GUI such as GEOS.

The Light Pen 170 is a fairly nondescript device, resembling an oversized pencil on a short cord. The tip of the aluminum pen is actually a large switch, toggled by pressing the pen into the screen. Inside the tip is a photoelectric sensor. The Light Pen itself comes with a single floppy and a manual. The manual documents the basic principle and operation of the pen, and includes developer documentation for those who want to integrate light pen support into their programs. The disk contains some basic examples of this support in practice, including a "Follow Me!" program based on the old Simon electronic game, and a couple of interesting music-generation programs. Nothing stunning or incredibly useful, but they at least provide a simple way to verify that your pen works, and allows you to get comfortable with the pen itself.

Flexidraw 5.5



Flexidraw, sold separately, is the companion paint program to the Light Pen. While it allows you to use a mouse, joystick, or touchpad as alternative input devices, it clearly was designed for the pen. Most options are selected by touching the pen directly to the text on the screen, and the rest are largely done through function key commands, for which there is an overlay for both the 64 and 128.

Flexidraw's multitude of features include: multiple line widths for freehand drawing, rubberbanding and point-point lines; auto shapes; ten fonts in three sizes; Undo; two separate work screens, which allow split screen for large work; pattern fills; shading; edge outline; rotate, flip; and copy/paste. It offers a wide array of printer support including dot matrix, color and plotters, and has a library of symbols to include in schematics, floor plans or math and scientific equations.

Flexidraw actually consists of two major portions; Flexidraw and Pen Palette. Flexidraw creates high resolution pictures. In the program, you simply draw black on a light gray background. After you have finished your image, you save it and re-load it into Pen Palette. Flexidraw allows you to draw in three different pen thickness and has a very basic spray tool. In addition, lines, boxes, and curves (including circles and ellipses) can be drawn automatically. Flexidraw actually draws on a "virtual canvas" that is larger than the screen. You can scroll across this canvas, or flip to another page to work on individual portions of a picture to be clipped and pasted later.

Flexidraw is very responsive and accurate when drawing in the single-pixel width pen tool. However, when you select a thicker pen, you will have to exercise caution and patience while sketching or you may wind up with extremely jagged turns rather than the smooth curve you were drawing. A Zoom tool is provided for close-quarters work, in order to get your picture just right.

Once complete, you can save off your image. But you'll just have a boring black-on-gray picture. That's fine if you're going to use it as clip art or the like later on, but what if you created a woodlands scene or a portrait and aren't very happy with its bland appearance?

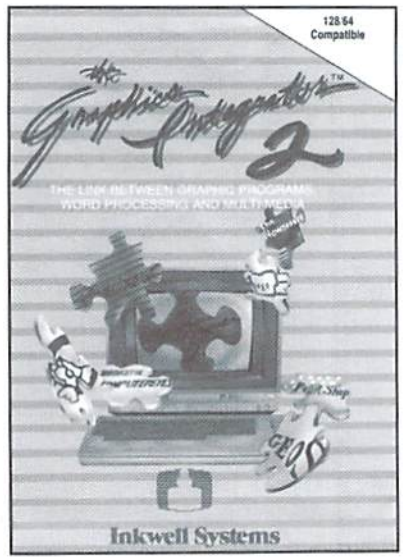
Once again, the 64's clever hardware comes to the rescue. Higher resolution always comes at the cost of color. While Flexidraw itself only creates pictures in two colors; a background of light gray and a foreground of black, the true restriction on Commodore 64 high-resolution is that no more than two colors may occupy the same 8 pixel by 8 pixel space. This 8 x 8 restriction is the same that applies to standard Commodore character sets, where each letter and symbol is made up of 64 pixels and the entire character space is 40 across long by 25 down. This is where Pen Palette comes in.

Pen Palette allows you to load any Flexidraw high-res picture and colorize it. You can assign up to 23 different combinations for color foreground and background. Then, when you take the light pen to the screen, you "color in" the 8x8 grid location you touched.

Thus, you could create a blueprint where the actual plans and schematics have a blue background and a white foreground, but the scale can be made to stand out in an eye-catching purple on black. In this way, you can actually get all 16 colors on screen at once, so long as you confine yourself to the 23 combinations allotted. Pen Palette is not a drawing program. However, for emergencies, a zoom-edit tool is provided in case you need to do a last-minute touchup and don't feel like exiting and re-loading Flexidraw.

The whole concept of coloring in grid sections may seem uncomfortable and difficult to prepare for. But Flexidraw makes it as easy as possible. With the touch of a function key, a grid appears on the screen, showing you exactly how the 8x8 pixel areas are distributed. Armed with that knowledge, you can make sure that, for example, your green tree doesn't extend into the same space as your brown bear, so your tree doesn't suddenly turn brown or your bear grows a green patch.

Flexidraw also supports a range of printers, in case you want to take your work with you. There is provision to use Flexidraw as a rudimentary terminal program, to send your picture to someone else, but you will likely find that a dedicated terminal program does the job more conveniently and efficiently.



The Graphics Integrator 2

Another great stand-alone package, The Graphics Integrator, allows you to convert your entire library of pictures between a variety of graphical formats, so that you can take a Flexidraw project over to Blazing Paddles or GeoPaint and vice versa.

The Graphics Integrator is a great tool for the graphics enthusiast. It offers three main features: Graphics conversion to and from Flexidraw, Doodle!, Koala, GEOS, PrintShop, Newsroom and more, Slide show creator features shutter, sparkle and open door formats, as well as three presentation formats. The picture conversion feature allows you to convert pictures for use in any word processors with external file capabilities.

TGI's primary goal, other than allowing the sharing of pictures between specific applications, is to convert high-resolution pictures to multicolor and back. Multicolor mode on the 64 gives you the ability to use four colors in a 8x8 pixel grid instead of two. However, you lose half of your horizontal resolution, meaning that each pixel you draw is actually twice as wide as it is in high-res. It is largely a question of artistic license and personal preference as to which you find more attractive.

Most popular formats, such as Flexidraw, Doodle!, Blazing Paddles, and Koala pictures are one-step conversions. As the picture loads and is converted, the final product is displayed, so you get a feel for what the difference between the formats is if you switch from high-res to multicolor or back. The one major exception is GeoPaint's high-res pictures, which can only be exchanged directly with Doodle! format. From the Doodle! picture, you can then convert to any of the other popular packages.

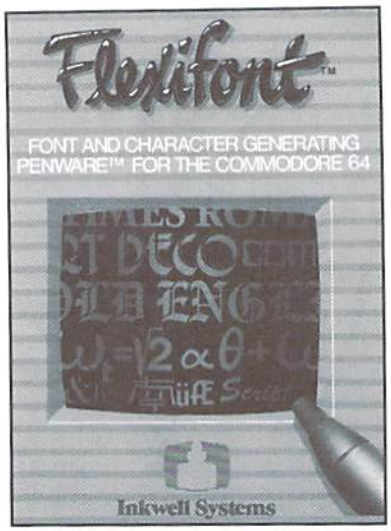
For packages such as Print Shop, TGI lets you save off "graphic" formats from pictures, which are actually smaller sections of a larger image. Of course, you are free to convert out of the graphic format as well. You can also convert images into Paperclip format, for integration into your documents. TGI also has a slideshow presentation system which allows you to cycle through a pre-set order of Doodle! images on one or two drives. The basic transitions between pictures gives the setup a sense of style.

Of all of the PenWare products, TGI has the most attractive and well-conceived interface, finally putting the light pen to good use. The keyboard is rarely needed, as you can select files from directories by simply touching the pen to them.

A color printer driver, for certain Diablo, Epson, and Canon printers, is provided. You can also print to conventional black printers in one of six different configurations and orientations. TGI's responsiveness and speed of conversion is considerable, and I find the package to be a very useful tool.

FlexiFont

Rounding out the available PenWare is FlexiFont. In short, FlexiFont lets you design your own character sets for use in your own



programs, or for adding text through paint programs such as FlexiDraw.

Flexifont will let you create patterns, symbols and letters for use with Flexidraw. It includes 33 font styles, font capture program and file mover to relocate fonts. You are given the ability to edit the entire range of characters, including all reverse, shifted, and Commodore-key symbols. Quick rotate and flip commands, as well as the ability to cut and paste characters, can make fleshing out a new look go fairly quickly.

FlexiFont also lets you tackle "Flexi" fonts, which are 16 pixels by 16 pixels rather than the standard 8x8. These are often called "2x2" fonts, reflecting that they are two character spaces wide and tall. This is accomplished by employing the lower-case, upper-case, lower reverse and upper-reverse version of a regular font to build a new, larger font. The down side is that you can't define as many overall symbols, since each symbol you use takes up four characters.

The interface adjusts accordingly to "normal" or "Flexi" mode, allowing you to edit the entire letter in question by turning each pixel of the character into a single screen block. A grid of 8x8 (or 16x16) blocks appears, changing whenever you choose to work on a new character. A number of different fonts are included, both as proof of concept (such as the mathematical font) and as practice tools.

This concept is nothing new, and several freelance 64 programmers have taken advantage of fonts far larger than 2x2. I have even seen a character set in which each letter took up the entire visible screen, but such techniques are beyond FlexiFont's scope.

Still, the interface is well suited to the light pen and is worth a look. The included "Font Capture" program may be worth a look in itself. It allows you to quit or reset a program that contains a font you would like to have, and scan memory to see if it is identifiable. If you can find it, you can save it and touch it up to your own purposes.

Graphics Galleria 1 and 2

Each Graphics Galleria consists of four 1541 disks. Each disk contains the same images on front and back, but the front is in Flexidraw format while the back is in Doodle! format. A printed insert is included with pictures of each disk's artwork. Graphics Galleria 1 contains themes of Borders and Signs, Maps of the World, Holidays, and Clipart Potpourri. The borders and signs are actually quite good, and the monograms (large, fancy letters) on the potpourri disk are the real standouts here, although having the time zone breakdown of the United States on the Maps disk has to come in handy for somebody out there.

Galleria 2 gives you Animals, The Office, Futuristic Encounters, and Potpourri II. Animals is a decent collection, while the office is pretty shaky quality. The futuristic images are a nice mix, yet all very cartoonish. Potpourri has a few choice images, such as Honest Abe and Uncle Sam.

A very straightforward and obvious application of these packages is to use them as self-tutorials in Pen Palette, so that you are able to familiarize yourself with the colorization process and the ways in which you can optimize the way color fits into those little cells.

The Light Pen as a GEOS Device

Now we've reached the point where the pen REALLY shines. Forget everything you know about GEOS, especially if you're still using a joystick. There simply isn't a more liberating way to use a GUI than with a light pen. It gives "point and click" a totally new meaning.

GEOS 2.0 has an excellent driver for the Inkwell light pen. Unlike most of the PenWare offerings, it uses the pen to its full potential. The PenWare software, except for The Graphics Integrator, treats the light pen as only "active" when you physically press the screen. But in reality, the light pen reads the screen and sends out a signal to the computer whenever it can "see" the screen with enough clarity, which usually starts at about 3 to 4 inches from the tube.

GEOS treats this as it would treat the movement of a mouse or a joystick. The pointer follows your pen as you aim it at the screen. To click, as you would click the mouse or your joystick, you press the pen onto the screen, as you have been doing with the other software. The great advantage of this method of input is that unless you're doing a click-drag, you have a great deal of freedom of movement with the pen.

As GeoPaint is in most respects a superior paint program to FlexiDraw, I quickly became enamored with GeoPaint and the light pen together. Unlike Flexidraw, you can SEE your pen on the screen without actually pressing physically on the tube. For general desktop navigation, setting preferences, or playing a round of blackjack, the pen is without a doubt in my mind the best way to interact with a GUI.

There is a caveat to all of this; make sure you are seated comfortably with respect to your monitor. It's not hard to do, but if you're sitting in a twisted fashion, you will feel it in your back in short order. The pen is lightweight enough that you shouldn't cramp up under regular usage. This goes for GEOS as well as any other program where the pen will be your input device. Another drawback is the pen's relatively short cord. Being a standard joystick-style device, it can easily be extended, but the fact that it is necessary at all is worth a complaint.

In Conclusion...

The PenWare software is a mixed bag. Flexidraw is actually more useful for its Pen Palette feature than it is for the Flexidraw portion of the program. The Graphics Integrator is an excellent image processing package for those without the means to run IPort. I was upset to discover that the programming, apparently in the custom load routines, of most PenWare software was incompatible with the Action Replay 5 cartridge. Simply disabling the cartridge clears up the problem.

At about $75, the Light Pen is more expensive than the conventional methods of getting around a program. But for a price comparable to a SuperTrack, it is definitely worth consideration. I recommend it, particularly if you do a great deal of painting, image processing, or GEOS work.

- Jason Compton

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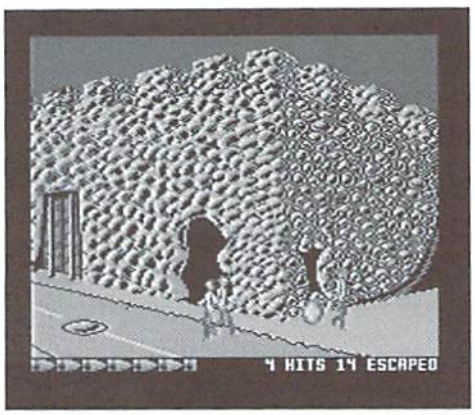


Shoot 'Em Up

Threshold Productions
Available from CMD

Somebody pinch me! Am I dreaming? Perhaps not, but Threshold Productions has me fooled. They've announced so many new games recently that I've lost count. And from what I hear straight from Threshold Productions themselves, there's plenty more to come.

The Shoot 'Em Up Pack contains four new games: Gangster, Time Traveler, Army Days, and Ghost Town. Even better, the package retails for approximately $14.95. All of the games focus on satisfying those of us with a trigger happy finger. Unfortunately, I only got to test my skills on two of the four games; Gangster & Time Traveler.

Gangster

Gangster hires you for a job fit only for the most fearless of marksmen. It seems that all "you know what" has broken loose at the Statesville Prison. There's been a riot and the prisoners are rapidly fleeing the penitentiary. The goal of the first round is to shoot twenty inmates before they escape.

You will need keen eyes and quick fingers to complete just the first level of Gangster. The difficulty is in the location of the prison's two exits; one at the front and the other on the side. They are far enough away from each other to make it difficult to quickly move from side to side. I have yet to master the ability to shoot two escaping inmates simultaneously. But the game doesn't require you to shoot every inmate. You only have to shoot twenty before they run away in order to become a winner.

I can't tell you what happens on successive levels because not only did I never manage to complete the first round, the game doesn't come with any documentation, and there isn't any included on the disk, either. However, the game is so easy to play that you don't really need them. But out of curiosity, I'd like know what to expect on consecutive levels as well as how many levels the game contains.

Gangster's graphics and sound effects are good, but not outstanding. It's only real lure is the challenge of a good shoot 'em up game. With Gangster, Threshold Productions has excelled at keeping the player more than adequately challenged.

Time Traveler

In Time Traveler, the goal is to overcome the planet's three world wars to change the balance of power of your planet in the future.

This game is my favorite, basically because it's easier! It still presents you with an enjoyable challenge; but one that occasionally lets you enjoy the fruits of success. In addition, I found the graphics more appealing.

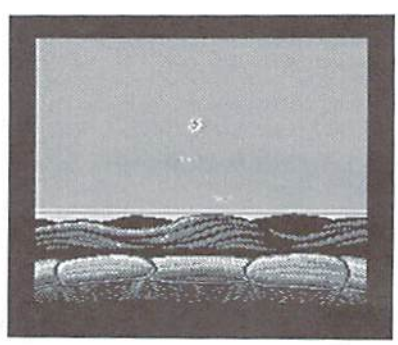
I can proudly say I was able to survive two of the world wars, and although commendably fought, I didn't survive the third. The battles take place in a variety of landscapes. The three I encountered consisted of shooting overhead spacecraft from land by day and night and then again from sea. The variety keeps the game interesting. As the game progresses, the spacecraft come at you faster and become more numerous.

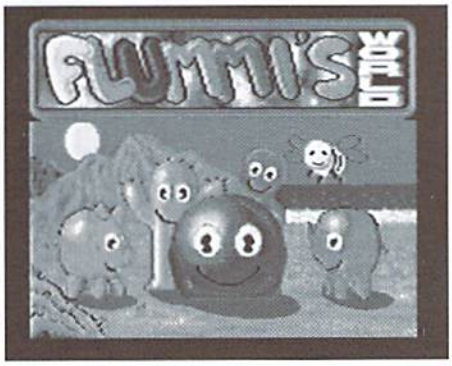
As in Gangster, the game lacks documentation, which I've always felt helps to set the atmosphere for a game, and helps explain what you'll be seeing; giving you a sense of when you are making headway and when you aren't. In Time Traveler, I found it difficult to tell how well I was playing. The only way to determine if you had a good game is whether or not you were allowed to enter your name into the Top Ten Scoreboard. However, the game is very easy to play straight from the box. Time Traveler is great for those occasions when you're looking to relieve a little stress, but are short on time.

The package I received contained both programs on one disk. An easy to use menu allows you to pick and load your desired game. At approximately $14.95, The Shoot 'Em Up Pack is a great value. Many games retail for more than that, but here you get four great games for one low price.

I'm anxiously anticipating more games from Threshold Productions. It's great to see people still devoted to providing Commodore fans with quality entertainment. A huge thank you goes out to the folks at Threshold Productions from perhaps one of the world's biggest Commodore fans.

- Sherry Freedline





Flummi's World
Threshold Productions
Available from CMD

Flummi's World, a brand new game for the Commodore 64 from Threshold Productions, will not only impress you, it will give your brain the work out of a lifetime.

Flummi's World is packaged in a plastic bag containing screen shots from the game, the program disk, and a 4.5" by 2.5" quick reference card. That's it! I looked high and low, but was unsuccessful in finding any documentation. After studying the screen shots, I figured that Flummi's World must be an easy-to-play arcade game. And from the screen shots, the graphics looked promising. Eager to see how the actual game compared to the screen shots, I turned on my Commodore and loaded the game.

My first thought upon viewing the title screens, was "WOW!" There is no question that Flummi's World is new! This game easily stacks up against those played on newer and more expensive machines. The silliest item was the thing that impressed me the most; the appearance of the blue 3.5" Flummi diskette announcing that my Commodore was busy loading. This technique is commonly used on PC games. I think the only reason it impressed me was because it made me stop and think how long the Commodore has been around and how it has now boldly dived into the Nineties.

Flummi's World begins with a menu page, where four options are available: View Best Flummi's (the High Score Hall of Fame), First Aid (a very well-done help screen), Enter Password (allowing you to start at your level of choice, providing you jotted down the password), and finally, the option to start your adventure. Here, you can tell how much thought went into the creation of Flummi's World. The First Aid option provides you with a page showing the extras: bonus objects, doors and transporters you'll encounter along your adventure. My favorite option is the password feature. This allows you to start the game at the last level you mastered. A lot of games force you to start the game at the beginning upon the loss of your last life. But Flummi's authors were considerate enough to provide this option saving players from hours of unwanted repetition. (Thank you!) The game also includes a secret shoot 'em up level, providing you can figure out the secret password.

Also found along the bottom of the menu page is a line of scrolling text. It is here that you'll find the object of the game. Flummi's World transforms you into a lovable, purple slug-like creature, (a Flummi) lacking arms and legs. You've been selected to save Flummi Land from darkness, doom, and the loss of it's magical powers. Flummi Land depends on a magical bowl for life-giving power, although the bowl more closely resembles a ball. Flummis maneuver by sliding and jumping from place to place. They also possess the ability to create blocks at will, enabling them to climb to heaven if they so desire. A press of the joystick button creates a block almost anywhere on the screen. These blocks are used to create stairways to various locations.

Flummi's World contains 30 levels. Each level presents a puzzle for you to solve. The object is to safely find your way to the bowl, usually in an out of the way location, by creating blocks to impede enemies, fill potholes, and climb to the bowl's location. Once you've reached the bowl, you must clear its path to the door or transporter. Accomplish this feat and you're whisked away to the next level. It sounds easy enough, but in actuality, it's quite a challenge. There are plenty of opponents and obstacles along your path. The enemies will eat away your life power, eventually resulting in your death. Fortunately, each game provides you with three Flummi's.

Near the end of the game, I had a brainstorm regarding the game's documentation. A lot of the newer PC games no longer come equipped with hard copy documentation. Instead the docs are included on the disk/CD. Since Flummi's World is a modern game, I decided to check the disk directory. There they were; and very nicely done, I might add. Like the game, the documentation is well-presented in the form of a demo, complete with music! Not only is it easy to access, where I'll never lose it, they've also helped the environment and saved some trees! However, a note indicating their inclusion on the disk would be helpful and time-saving.

In closing, if you love brain boggling puzzle games, I urge you to try Flummi's World. I have played hundreds of games on my Commodore, so it takes quite a bit to knock my socks off. With it's colorful graphics, entertaining music, modern presentation, and challenging puzzles, Flummi's World has certainly grabbed *this* game player's attention. I'm looking forward to more fantastic creations from Threshold Productions.

- Sherry Freedline

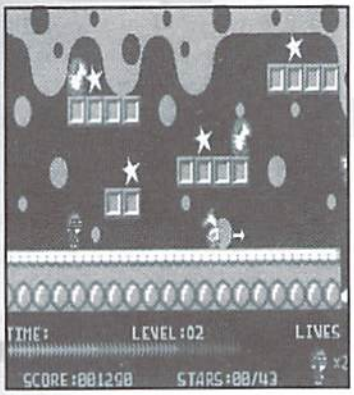
GAMES · GAMES · GAMES ·

MORE NEW GAMES

EXCITING NEW PRODUCTS AVAILABLE FROM CMD IN 1996...

THRESHOLD PRODUCTIONS *presents*

SLATER MAN



Armed with an unlimited supply of ammo, you set out to retrieve all the stars and terminate or avoid the creatures who try to stop you, while humming the catchy tune featured in this game. SlaterMan features five unique screens for each level, passwords for moving to a given level, plus the ability to enable both music and sound, just music, just effects or silence. SlaterMan is a well designed game promising a great escape from everyday stress; but best of all, you can play it without reading volumes of instructions!

SLATER SlaterMan **$14.95**

WALKER'Z

Walker'z are genetically engineered life-forms programmed to reconstruct dying planets, and turn them into class M planets which can support human life. Walker'z do not require oxygen, can go weeks without food and water, are 10 times stronger than a man, and have a life span of more than 200 years.

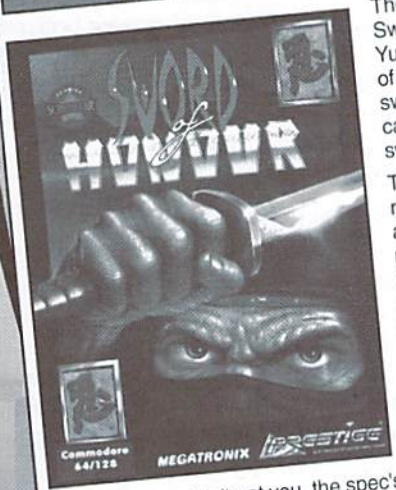
In the year 2101, Walker'z are sent to the planet Talia, which is about to implode and create a black hole. Only 72 hours remain when the Walker'z land on the planet. However, shortly after they take up position, a freak magnetic storm completely erases their memory, causing them to run amok across the planets surface.

You watch in horror from your satellite as the Walker'z wander aimlessly; running the risk of falling into chasms, power generators, or off the edge of cliffs! Realizing that you and all of the Walker'z could be destroyed by waiting for technicians from Earth, you try to find a way to save the Walker'z until help arrives. By diverting power from the satellite's shields, you can create a shield on the surface, large enough to save one Walker at a time. With everything on the line, your reflexes and concentration must be keen!

WALKERZ Walkerz by EBES **$19.00**

COMING SOON!

SWORD of HONOR



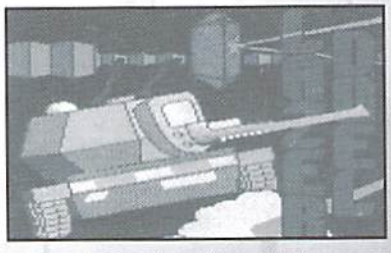
The dynasty sword, known as the Sword of Honor, has been in Shogun Yuichiro's family since the beginning of time. Tradition says that a Samurai's sword is his soul and that no one else can touch it, which is why the Yuichiro sword has been guarded for centuries.

The power-hungry damion, Toronaga, ruler of northern Japan, would do anything to defeat his rival, Yuichiro, ruler of southern Japan. To further his quest to rule Japan, Toronaga has stolen the Yuichiro sword. Finding that his sword has been stolen, Yuichiro calls you, his most dangerous ninja warrior, to reclaim his sword and family's honor! Despite your power, you must beware—rumor has it that the evil damion has mysterious powers!

If the story line didn't get you, the spec's on this phenomenal game will. Try 2.5 megabytes of compressed data - that's right, four disk sides or one 3.5" disk! Outstanding graphics—over 90 colors on screen! Outstanding Sound! It also features: lethal weapons, vicious hand-to-hand combat, and awesome gameplay! And if that's not enough, there's even a special 3.5" version for1581, CMD FD, HD and RAMLink owners! So keep your eyes open for the Winter '96 release of this outstanding action game!

THRESHOLD PRODUCTIONS *presents*

Lazer DUEL



Fusion powered laser tanks firing through a field of geometric shapes that deflect or absorb each laser blast make up the field of play in this game of skill. Only those who have mastered the technique of banking shots in the direction of their enemy will survive! Single or Two player, Lazer Duel offers 40 screens and 80 levels—each victory bring's a greater challenge, making it difficult to beat the game!

LAZERDUEL Lazer Duel **$14.95**

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(800) 638-3263

See our general ad for shipping details

The SysOp's Corner

By Max Cottrell

MORE ON MODEM SET-UP

Feedback, I've Had Feedback...

Before I get started on my journey through the cyber world of frustration, I should clear up some confusion. First, your modem selection should be made with three things in mind:

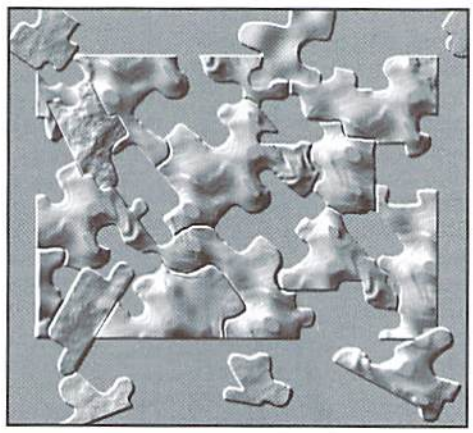
1. Price
2. Commodore-ability
3. BBS (auto-answer protocols) capabilities.

Second, when I talk about what my system does, or what another software is supposed to do, don't assume that it is written in stone. Each system is different, and sometimes this varies from computer to computer. I use Does The Job software, and it will not run with a RAMLink on a C64 or a 64C, but will go like the wind on a 128D. If I say that I am able to do something, don't be frustrated if it doesn't happen for you. Also, I will render whatever assistance I can to new SYSOPs via E-Mail as I can, so feel free to ask.

Navigating NVRAM

Last column, I mentioned NVRAM when setting up your modem to work with your BBS. NVRAM stands for Non Volatile Random Access Memory, which means that there is a little memory inside your modem that will allow you to set up how a modem will run when you turn it on. A lot of modems have two, three or more 'templates' that you can configure in any way you want. My US Robotics (USR) Courier has four of these 'templates'. They are nothing more than a series of commands that the modem reads when it is turned on, or when you tell it to use a certain template to run from. Some modems have the ability to store passwords so you can have only a few of your friends or customers who are able to get into your system. Since my experience is with my USR Courier, I will use it as the guinea pig.

You may recall that in my last column, I discussed some of the pitfalls of modem setups



that you will run into when you are getting your BBS going. Don't panic when you have a problem—these things just happen. For example, the ISP (Internet Service Provider) that I subscribe to runs on a SUN (Unix-based) computer. The banks of modems (12 at 14.4K bps, 6 at 28.8K) use an advanced circuit board to communicate with the main computer. The problem is that the board costs thousands, and it doesn't like to work with a SUN. Which means that this high end system that connects to users who pay up to $50.00 a month, has modems that have to be reset by hand each and every time a user calls in. Imagine being the SYSOP of that system! Those of you who are regulars on GEnie will be familiar with the old 'disconnected' routine that has plagued the GEIS network that GEnie uses. If systems like these can have modem problems, so can you. Users expect it. SYSOPS expect it. So don't get upset when someone calls you to tell you that your BBS has been down for a few days. Not that anything like that has ever happened to me...

Modem Setup

The first thing that you want to do is to take some time and find out what templates your modem has stored in them already. Each modem manufacturer has their own little commands that are specific to that brand. Which means that the command AT&B1 on one modem might mean something wildly different on another.

Some commands, S0=1 (set the auto-answer to pick up on one ring) are universal. This is where your modem manual becomes a SYSOPs Bible. You have to it handy at all times when setting up your BBS. I strongly suggest learning what your modem will do, what it is capable of doing, and what commands are compatible with a Commodore. It's been my experience that it will take about a month of daily fiddling to get your modem set up the way that you want it.

In my first column, I mentioned that you will need beta-testing-users. Here is where they become worth their weight in gold. Why? Because, like it or not, a lot of your users will probably be calling from an IBM or a Macintosh. These computers have hundreds of terminal programs. Each one has it's own little way of throwing sand in the finely meshed electronic gears of your modem. Just when you think that you have your BBS set up and humming along, you'll find that there are a whole group of users who cannot get on for one reason or another. Your beta testers, some of whom will probably have one of these accursed machines, will find problems for you. Some friends, huh? But better them than a user who will never call back.

When you are setting up a NVRAM for a BBS, you will want to see what is stored in them. Load a terminal program like Novaterm and enter the terminal. Keep your serial port speed slow so you can see all the commands as they appear on the screen. I use a serial port rate of 300 baud when doing this. From here, you can enter commands and phone numbers to the modem. Keep in mind that I am using USR commands, which might not work on your particular modem. The USR Courier also has the ability to have a modem installed password, so you can have really tight security on your system. Type in AT&V0 (which means,

attention modem, show me template one). You will see something like this:

ACTIVE PROFILE:
B1 E1 L2 M1 Q0 T V1 V3 X4 Y0 &C1 &D2 &G0 &L0 &M0 &O0 &P0 &R0 &S0 &X0 &Y0
%A000 %C1 %D1 %L010 %P0 %S0 \A3 \C0 \E0 \G0 \J0 \K5 \N6 \Q3 \T000 \V1
S00:000 S06:002 S07:045 S08:002 S09:006 S10:014 S11:095 S12:050 S14:8BH
S16:1FH S21:30H S22:76H S23:17H S25:005 S26:001 S27:00H S28:10H

This is a list of what the modem has stored in it's first memory bank. You can change these commands, and they will be stored in the modem. For instance, if you issue the command, AT&S0=1&W, the Courier will change the register S0 from 0 to 1. This is the auto answer. You have just told the modem to answer on the first ring on the phone. This is a simple command, which is foolproof. Here are some commands you might find universal. The universal commands are as follows: (I know half of you will write and tell me that these won't work on your particular modem, but they all work on all six of mine.)

x= a number

S0=x (auto-answer)

AT&Vx (display the NVRAM setup. No number means all of them)

AT&Tx (test the modem. Some modems do not support testing.)

ATSx (these are the 'S' registers. These are some of the most important SYSOP controls)

AT&Nx (baud rate variable or fixed. Useful if up/downloading problems happen a lot)

AT&Bx (serial port rate. This is the modem to computer settings. Very important.)

AT&Mx (error control, data compression. You can get in deep trouble with this one)

AT&Kx (data compression switch. ditto)

When looking at modems, make sure that the book that comes with it is well written and has clear explanations of all the commands it uses. This is one of the main reasons I like the USR Courier. I hate to keep coming back to that particular model, but out of the six that I have, this one works the best. Also, it is outstanding for customer support and settings.

Why use NVRAM?

By now you're probably asking yourself that question. The answer is: NVRAM will keep a record of the commands that make your system work well. Say you have a power failure, and you lose your software setup or something bad like that. Your modem has the hardest part of your setup stored in it's little brain. Even if you don't use the NVRAM setups, they are handy to have.

Writing to NVRAM

To write commands to the NVRAM, you need to tell the modem to store the command in it's memory. The extension to the command is usually &W, which means 'write this to memory'. When doing a lot of NVRAM work, it's important to remember that you need to check the system often to make sure you haven't done anything terribly wrong. Most modems have a factory template that comes up when the modem is turned on. Don't change this one! It is a safety mechanism for you to return to if you need it. Set up the second template, which should be V1 (the templates start at 0, so 0 is one). Change each register one at a time, and take the time to restart the BBS with that command in place. Run whatever tests you do to make sure the system works with that command. If it doesn't work, start over by changing that command back to what it was. This may mean endless re-booting and restarts on your computer, so I suggest you get a routine for this. I use a hard drive and JiffyDOS, so all I have to do is type /cmd* and return.

I'll end the modem section with a listing of the commands I use on my BBS. These are US Robotics specific, so they may generate error messages with your modem. The key thing with modem setups is that you have to fiddle endlessly. Each modem/computer/software combination has it's own little quirks. If your friend, who has the exact same setup, can get it to work, do not assume that you will be able to. Sometimes, modem chipsets (the main chip in the modem, usually a Hayes compatible one) vary from modem to modem of the same model. Here is my setup string:

ATS27=0 ATS28=0 ATS51=0 AT&K0 AT&m4 AT&b1 AT&a0 AT&v0

These set up the modem to do things like use the numeric response codes, error controls, etc. They work for me, and they may work for you, too.

The Fun Stuff of BBS Setups

As I've mentioned, I make reference to my system a lot. I use DTJ, which is different from say, Omni 128 or Color64. In the future, I'll be trying to write about the other BBS programs for the Commodores, using what other SYSOPs have written for their systems. I'll try and keep this as generic as possible so you can start your system right away.

When a user calls your system, the first thing they see is the most important. A title or graphic is the norm here. My system asks if the user wants to use ANSI graphics. I have a little title screen associated with this. I have the name of the system, what speeds it will work at, and any major quirks. Here is something what that screen looks like:

YCIS
Welcome to the Ypsilanti
Community Information Service

---

betatest V3.4
upload speeds to 4800 baud
download to 14.4

Would you like to use ANSI
graphics? (Y/N)?

As you can see, I have the most important information on this screen, along with the speed abilities of the system. I have added these to the general 'do you want ANSI' question because this is permanent information on the system. You'll also see that I use a centering command that makes the screen look more professional. I know that this goes without saying, but it is important to remember that the majority of users who call you will be on 'high end' machines who will simply hang up if they find that out that they are calling a Commodore system. I know, I know... there is nothing wrong with using a Commie to run a BBS. Same speed, same BPS, same ANSI graphics. You can store IBM and Macintosh programs on a Commodore BBS (I know from whence I speak; I have several); JPEG, GIF, and BMP style photographs and you don't even have to do anything special to store them, just upload them. Usually if you don't tell them that the computer has CBM written on it, they don't even know. My advice is if they don't ask, don't tell.

As always, feel free to send me feedback, complaints, and ideas to one of my E-Mail addresses.

E-Mail addresses for Max Cottrell:

mcphoto@izzy.net
mcphoto@genie.com
mcphoto@hvcn.org

Carrier Detect

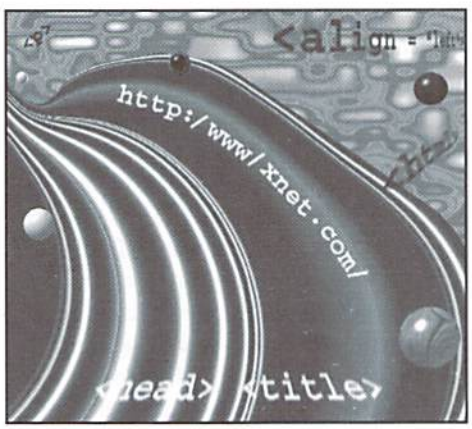
By Gaelyne R. Moranec

"THE WAVE" AND THE NET: Q & A

New and Improved! Old and just as good! Well, not quite; it should actually be older and BETTER, but sometimes us Commodore users get lulled into thinking that the current state of computing for us is here and now and that it isn't going to change. Stagnating? Static? Not on your life! Anyone believing this hasn't been reading *Commodore World*! Sometimes it can be a real challenge for me to cover the news and try to deal with users concerns and issues. But in this issue, I'm going to attempt to do both and try to answer some of the many questions I've been asked. Hopefully this will help as many readers as possible find their pot of gold (or cache of Commodore goodies) online and off.

GEO-Surfing

Surfing the Nets with GEOS will soon be possible when Maurice Randall introduces his new terminal program, "The WAVE" for GEOS128. Taking advantage of the SwiftLink cartridge and allowing modem speeds up to 28.8k bps, this term program will let its users share GEOS files seamlessly, because it translates the files during the file transfer. The Wave has the familiar point and click icons and drop menus that GEOS users are accustomed to. Both ANSI and ASCII terminal emulations are supported as well as Xmodem, Ymodem and Zmodem protocols. It sounds as if Randall is going to be giving GEOS users the terminal program they've been begging for. The Wave will have chat facilities that include a scrollable 240 character line buffer, which should be a major plus for users who attend conferences or enjoy chatting online.



Additionally, it uses what Randall refers to as a "virtual" buffer for incoming text, saving the text as geoWrite pages. The program allows the user to access geoWrite directly, letting the user compose text with geoWrite and return to The Wave when finished. Messages or other text (such as E-Mail addresses or WWW URLs) can be stored in Text Albums and used for sending text back to the terminal. While The Wave will require the use of a SwiftLink cartridge, it doesn't require a RAM expansion device, but one is highly recommended. The final version will be a commercial product of Click Here Software, but a public domain version of The Wave will be online very soon. The P.D. version will not allow file transfers but will let the user connect to BBS's (or the Internet) and explore the new software.

In years past, before the advent of offline mail readers, I used to read the text from messages using geoWrite and save bits I wanted to reply to in Text Albums, and have always thought it would be a good medium for telecommunication use. It's good to see I'm not alone in that line of thought. It wouldn't surprise me if we see a GEOS QWK offline mail reader in the next year, too. After all, if GEOS users can have the terminal program they've always craved, why not have an OLR too?

QWKie 3.1 For One and All

This may be exciting news for some, but announcing this saddens me, as I hate for any good software to lose the support of its author. On November 18, 1995, the author of QWKie v3.1, Arthur Moore, posted a brief message in the CBM Fidonet echo announcing that due to business and personal reasons, he hasn't been able to support the program, and released his QWK Offline Mail Reader for all to use and enjoy. The full featured freeware version of QWKie is available on BBS's and FTP sites as QWKIEFRE.SFX. It's my hope that someone will pick up where Arthur Moore has left off and continue developing QWK offline reading for the Commodore 64.

From the Mailbag

A majority of the questions I have been asked in the last several months have concerned the Internet, and about accessing it with our computers. Here's a sample of what we have available to us.

Q: How do I access the Internet? I knew about AOL being inaccessible, but I didn't know GEnie and CompuServe were available. I figured they were all off-limits to the C64.

A: GEnie, CompuServe and Delphi are still available services for Commodore users. These services have been undergoing changes geared towards other computer platforms, but none of them have eliminated their text-based services. Additionally, there are other Online Services such as CRS (a Canadian service) and many Bulletin Board Systems that are becoming so intermeshed with other networks, including the Internet, that it's hard to draw a line between calling them a Bulletin Board, Online Service or Internet Service Provider. In many cases, all three may be combined.

Accessing the Internet is actually quite easy. You need a terminal program that uses either ANSI or VT-100 emulation. For C64 users, this means you need to use Novaterm, and for 128 users, you can use either Desterm, Dialogue128, or even Bobs Term Pro. You can also use the terminal program in ACE14 (in either C64 or C128 mode) but unless you have a UNIX account, you won't be able to transfer any files to or from your computer and your Internet provider, because it doesn't yet have any standard protocols.

If you have a working modem and one of these term programs, you can access the Internet. The other requirement is a place to call. To repeat: you need a term program that uses ANSI or VT-100 emulation and a working modem. That's all you need.

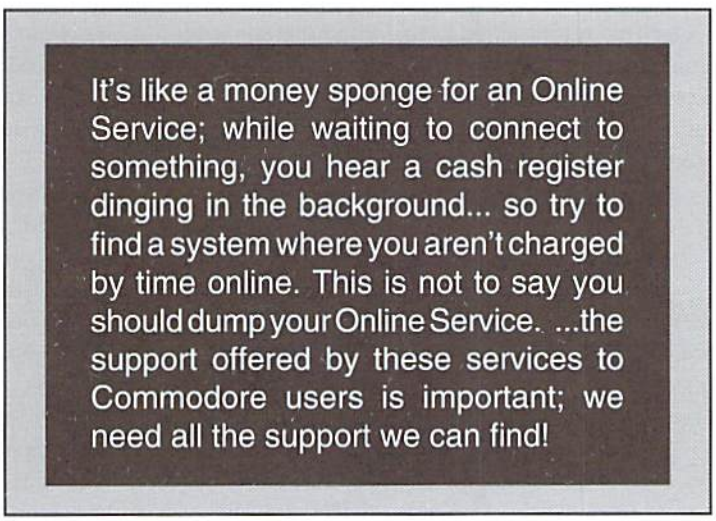
Q: Can you explain how I can access World Wide Web (WWW) pages using Commodore software?

A: For the Web, a text based browser is available on many Internet sites that lets anyone access WWW pages. The most commonly used text browser is called lynx, and it's a utility that you will find on the Internet service, NOT one that you load on the Commodore. To use lynx, first make sure your term program is configured using the VT-100 terminal emulation. On the service you use, look for a menu option called "lynx" or "www". This may also be found in the Gopher menu of some services. Select it, and if prompted, type in the URL (Universal Resource Locator, or the "address") of the web site you wish to check out. If you are using a non-menued UNIX system, you simply type "lynx <URL>" such as "lynx http://www.msen.com/~brain/guest/CMD/index.html" and press return. If you want to go to another link, press the "g" key and type in the URL of the new Web site you want to visit.

The reason you need to use VT-100 emulation is because portions of the text are highlighted. Most (but not all) of the highlighted areas are links to other sites on the World Wide Web. You simply cursor to the link you want to check out, and when the cursor is on it, press return.

Q: I can't tell where my cursor is when I'm using lynx! What can I do?

A: It may help if you change either the cursor color or the type of cursor you're using from within your term program. For instance, if you're using a blue cursor, change it to yellow, or if the cursor is an underline, change it to a block, or make it blink. Any of the above will help you be able to see which link you are on when accessing the World Wide Web.



Q: What's that little squiggle character I see in World Wide Web URLs?

A: You mean this ~ character? This is called a tilde. It lets the system know it can skip all the other directories until it finds the one that matches the word that follows it. In the above example, it tells the system to go to the directory named "brain".

Q: What key do I press to get the tilde?

A: This depends on which term program you're using. In Dialogue, the default is the shift "*", in Novaterm it's the shift and up arrow (the one next to the RESTORE key) pressed at the same time, and in Desterm, it's the shifted equal key. However, these could be mapped to other keys, such as the shift up arrow key in Dialogue, if you're using a different ASCII translation table. In fact, you can change these tables yourself to suit your preferences. If you've printed the documentation for your term program (notably the shareware terms such as Desterm and Novaterm), often for various reasons you will find that the caret (^) and tilde (~) may not appear at all, or may appear wrong. Just grab a pen and draw a squiggle where you see the word "tilde" and an up-arrow where you see the word "caret".

Q: I don't have lynx available on my system, but I can telnet. Can I access WWW?

A: Yes, you can telnet to someplace that lets anonymous users use the lynx utility on their service. One of those services is at Cornell University. Telnet to fatty.law.cornell.edu, and when the system asks you to login, type "www" (lower case) and press return.

Q: I tried that (and it worked before) but this time I got a message stating only 10 anonymous users were allowed. Does that mean try back later? Or has the system been changed?

A: It means try back later; it's the cyberspace equivalent to a telephone busy signal.

Q: I have to telnet to use lynx, and sometimes its sooo slow! Any advice?

A: Unfortunately this is one of the problems with telneting to use lynx. It's also something that will continue to be a problem, and may even happen for those who are using lynx on their own service. This is because much of the software used on the Internet is multitasking and with thousands of users, everyone is slowed down as the system performs a little bit of each persons job at a time. There are also times when the link you've requested happens to be very large which takes awhile to load. If it's taking longer than your patience can tolerate, you can abort it by pressing the "z" key and try another link instead. And more on the subject of time and patience, a common complaint from readers about one of the Online Services they access is:

"It's like a money sponge for an Online Service. Most of time I find myself waiting to connect to something, meanwhile I hear the cash register dinging in the background."

WHILE LOOKING FOR AN INTERNET PROVIDER, TRY TO FIND A SYSTEM WHERE YOU AREN'T CHARGED BY TIME ONLINE.

I hate to tell you this, but many of the Internet systems are like this. The Internet is not a super highway in the sense of speed. In reality, it crawls. It may pay to use the online service during its quieter times, if possible. If you're a night owl, you may find that between the hours between 2 a.m. and 6 a.m. the systems have less users and you can accomplish more.

While looking for an Internet provider, try to find a system where you aren't charged by time online. This is not to say you should dump the Online Service, though. I firmly believe the support offered by these services to Commodore users (especially those that have specific Commodore support areas) are important; we need all the support we can find! Access the Internet via another provider, but continue to use the Service for its Commodore support, and be there for others too.

More Comments on Online Services...

Q: I have found that the only way to send text from my buffer is to set the character speed and line pause down to around 110 baud to guarantee that everything you write is going get where it's going in one piece... what else can I do?

A: My sympathies! If you're using Dialogue, in the dial directory (or the main configuration menu), try changing the "Transmit mode" to "Stream2". The text will go to the screen very fast and look horrible, but it ends up right in the services editor. I've used this to send articles and it works quite well. If you list your message, you'll see that it formatted okay. If you're using this method on GEnie, you have to be careful about having any lines that begin with a "*", as GEnie's system will interpret anything that follows it as a command. This can actually be very useful if you know what commands to send.

Files Via FTP:

Q: How are you able to download files from FTP if you don't have Zmodem protocol? Can you, in fact, download via FTP?

A: On most systems, when you use FTP, the file is transferred from one Internet site to the one that you are on, so you don't directly download the files from an FTP site. When "FTP-ing," you tell the system what file you want by typing "get <filename>" or if you are getting a set of files you can use the command "mget <filename*>". The files are then copied to your system which depending on many different things can either be lightning fast, or turtle-slow.

Once the files are on your system, if you have a menu, look for an option that says download or file transfers. You should find your files waiting for you, and you download them just as you would a file that's on a BBS system, using Xmodem, Ymodem or Zmodem.

The tricky part is sometimes the files you've FTP'ed may be in a different directory from the one that the menu looks to. If this is the case, when the system asks for the filename you want to download, you will need to type the name of the directory it's in, followed by the filename. You may have to do a little "hunt and search" for it to find the proper directory. For instance, if the files were in a directory called FTP, you would type: "FTP/filename", or ~directoryname/filename" This is similar to what is needed with a UNIX shell account.

With a UNIX shell account, once you've finished your FTP session, you'll find that the files are in your home directory, or one of your other directories if you had changed before starting FTP. After checking to be sure you're in this same directory as the files, begin your download by typing the UNIX command to start it such as "sx <filename>" for xmodem, or "sb <filenam*>" for ymodem, then begin the download from your terminal program.

Unfortunately, that's all for this time, but I will be answering more questions in future issues. If you have questions about accessing Bulletin Boards or the Internet and already have a modem, you're halfway to finding the answers. Asking other Commodore users on the boards is one of the best ways to get quick information. Check out the Commodore areas on Delphi, GEnie and CompuServe, ask users in the CBM Fidonet echoes or in the comp.sys.cbm newsgroup. You'll probably receive many answers and a great deal of support. If you have other questions or comments you'd like to ask me, feel free to contact me via E-Mail at moranec@hal9000.apana.org.au or if you use Fidonet netmail, I can be reached at 1:366/221.128. As you can see, there's a world of support at your fingertips when you use your modem.

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GEO PROGRAMIST

UNDERSTANDING VLIR FILES

by Maurice Randall

After all these years, the mere thought of a RELATIVE file scares some people. RELATIVE file handling is built into the DOS of almost every drive ever built for the Commodore computer. In reality, though, you could probably use your computer every day for many years and not ever have to make use of a RELATIVE file, much less understand it's layout and it's many uses. That's really the sad part.

Have you ever noticed how some software programs come supplied with maybe one main program and many, many smaller support programs or files? There could be a half dozen or even 50 or more files to go along with the main program. As the main program is running, it is common to access some of these files for certain functions or configurations. All these multitudes of files really clutter up a directory. It also makes it difficult for the user to keep track of the files that belong to the main program. All of those files could be stored in one big relative file. Perhaps the reason nobody does this is because it would really be quite awkward to do so. RELATIVE files are nice for using with databases and other record keeping, but not really suitable for program storage, but with a little cleverness, it could still be done.

GEOS has a nice method for applying this idea, and it works very well. Just take a look at some of the larger GEOS applications, especially GeoPublish. At a single file size of 99K, you know that this whole program isn't possibly being loaded into your computer's memory all at once. There is likely one main part of the file that is loaded all of the time. This would contain all the common routines that can be shared by any part of the program. Then as the user changes from one mode to another, another part of the file will get loaded into memory along with the main portion. This is really a very good way to handle a large program on a small computer. No matter what the user is doing at any one time, only a small part of the program is ever needed anyway.

So, GeoPublish is all contained within one big file instead of several smaller ones. This makes it handy to copy the program from one disk to another. And the directory is kept clean too. But how does a programmer know what part of the file to access when a portion of it needs to be read in? And how does GEOS know which part to load when the program is first run? Let's find out...

GEOS calls this file format 'Variable Length Indexed Record', or VLIR for short. The file construction is just like the name implies. A VLIR file can consist of one or more records and each record can be of any length. A VLIR file can have as many as 127 of these records. There is a one block index contained within each VLIR file that serves as an index to locate the starting sector of each record. Since this one block contains 254 data bytes and two bytes are required to hold a track and sector pointer, that explains the maximum limit of 127 records. The records are actually numbered from 0 through 126.

To find this index block, you would get the track and sector pointer from the file's directory entry. The second and third byte that normally points to the starting track and sector of a file will point to this index instead. So, now that you know how to find the index, you've got access to the individual records. The first two bytes of the index block are always 0 and 255 signifying that this is the end of a chain of blocks and that all bytes in the block are used. Record #0 is pointed at by the next two bytes, then two bytes for record #1, two more for #2, etc.

Since there is no such thing as track zero on our drives, if the track pointer to a record is a zero, then you know that the record doesn't exist yet on the drive. Thank goodness for no track zero, or this would have had to be handled some other way. To elaborate on the track pointer being a zero a little further, if the corresponding sector pointer is also a zero, then the record has not been created in the index. If the sector pointer is a 255, the record has been created in the index, but no blocks on the disk have been allocated for it yet. As long as the track pointer is anything other than a zero, there is a starting track and sector for the record and the record can be read sequentially beginning with that sector just like you would a sequential file.

An example always helps. Let's look at a GeoWrite data file. There is always at least one page in a GeoWrite file. Page one is always stored within record #0. From reading the previous paragraphs, you should know how to find the first page of a GeoWrite file on the disk. Page 2 will be in record #1. If the track pointer in record #1 is a zero, then we know that page 2 does not exist and this GeoWrite file only has one page, end of document. Very simple.

Almost any kind of file can be stored in VLIR format. Large applications are ideally suited for this. But how does GEOS know which record to load when the user double clicks on an application to run? It's simple. Record #0 is always loaded first by GEOS. GEOS fetches the load address for this record from the file's header block. Also in the header block is the address that GEOS will access after loading record #0. From that point on, the application is in control and it will take care of loading in additional records as needed.

Now that you have a very basic understanding of the VLIR format, you need to know some easy ways to manage a VLIR file. GEOS has some built-in routines for creating, altering, and deleting VLIR records. We will study those routines in the next issue.

BASIC INSTINCTS

ALGORITHM CHOICES OR WHAT TO DO WHEN YOU'RE OUT OF SORTS

By David Pankhurst

When we think of the word organize, we may think of sorting things by category. Programming requires organization because our program users often expect sorted lists. Besides being easier to comprehend, they add to the professionalism of programs.

Sorting is an intensive operation from a computer's viewpoint; requiring computer effort of great magnitude. It's for this reason that algorithms that sort efficiently are especially vital. Consequently, a great deal of literature has been written discussing sorting, and the needs of the computer as regards time, room, etc. This issue, let's consider exactly how to sort, and how to do so quickly.

What Sort of Sort?

Careful choice of sorting algorithms is important for the C64. Sorting is primarily made up of two operations: comparing two items, and if necessary, moving or exchanging the values. Minimizing these two actions spells the difference between a fast, efficient algorithm, and one that will take (literally) forever. Of course, for small groups of items, mostly any sorting algorithm will work; the time difference may not be significant. Where the difference becomes noticeable is when the number of items to organize increases. This will become more apparent as we analyze different ways of sorting.

The first sorting routine to consider is the infamous Bubble Sort; infamous because it's too inefficient to ever be used in a program, yet almost every computer textbook includes it. Why? Although inefficient, it's very simple to program:

```
10 DIM N(10)
20 FOR I=1 TO 10 : READ N(I)
: NEXT : DATA 8, 2, 1, 7, 5,
3, 9, 0, 4, 6
30 FOR I=1 TO 9
40 FOR J=1 TO 9
50 IF N(J)>N(J+1) THEN Y=N(
J) : N(J)=N(J+1) : N(J+1)=Y
 : REM EXCHANGE ITEMS
60 NEXT J
70 NEXT I
80 FOR I= 1 TO 10 : PRINT "N
(" I ")=" N(I); : NEXT I
```

Lines 30-70 form the sort routine. It works by going through the list, comparing each of the ten items to a neighbor. If necessary, they are exchanged. Only nine comparisons are needed to check all ten items, so line 40 goes up to 9 only. An outer loop is necessary (lines 30 and 70) because each comparison only moves an item one place. To see how this is, look at the first value in the list, 8. After the first comparison, it would be exchanged with 2. After the next, with 1, followed by 7. In this way it 'bubbles' up the list. But when it reaches the 9, it stops, and the nine continues to bubble up. Eventually, after nine comparisons, only the last entry is guaranteed to be in place. After a second looping of nine comparisons, the second one (the 8) is in place, and so on. So we need to loop nine times through these comparisons to sort the complete list.

At this point, you can see why the bubble sort is not the first choice of programmers. Although easy to write, it quickly becomes unmanageable on large sorts. Remember the time stealers, comparisons and exchanges? For this Bubble Sort there are 9*9 or 81 comparisons, and 23 exchanges. On a random list, we can expect an average of 25 exchanges. If we double the list, a list of 20 items would require 19*19 or 361 comparisons, and about 100 exchanges. A bubble sort exhibits N-squared performance; doubling the list size quadruples the time spent executing the sort. On the C64, a sort of 20 items takes about 5.5 seconds, and 40 items takes about 22 seconds, so the squared performance is about right. But this puts the bubble sort out of range of larger lists—at this rate, 80 items would take 1.5 minutes, 160 would take about six minutes, and sort of 2000 items would take about sixteen hours! One improvement that could be made to this sort is by replacing

```
40 FOR J=1 TO 9
```

with

```
40 FOR J=1 TO 10-I
```

After the first looping (with J going from 1 to 9) the last item in the list is guaranteed to be sorted, and need never be considered again. So, the next looping of J should go from 1 to 8, not 9. By decreasing by one each time, you eliminate about half the comparisons. (In fact, the N*N performance stays about the same, but sorting times for all list sizes are improved by about 33%). "10-I" is the way to calculate the decreasing index —work through a few examples to see how it affects the sort.

Arrangements of a Different Sort

A major problem of the Bubble Sort is that is moves items only one position at a time. If a number was far away from its proper position (as the eight was in the example) it might have to be exchanged most of the way along the list, one place at a time. Other sort routines try to make up for this by moving an item farther at a time in hopes that the total number of exchanges will decrease. A very common one, the Shell Sort, looks like this:

```
100 NI=10 : REM NUMBER OF IT
EMS IN ARRAY
110 DIM N(NI-1) : FOR I=0 TO
 NI-1 : READ N(I) : NEXT : D
ATA 8,2,1,7,5,3,9,0,4, 6
120 PS=INT((NI+1)/2) : REM I
NITIAL PARTITION SIZE
130 FOR I=0 TO NI-PS-1
140 FOR J=I TO O STEP -PS
150 IF N(J)<=N(J+PS) THEN J=
-1 : GOTO 170
160 Y=N(J) : N(J)=N(J+1) : N
(J+1)=Y : REM EXCHANGE ITEMS
170 NEXT J
180 NEXT I
190 IF PS>1 THEN PS=INT(PS/2
) : GOTO 130
```

A Shell Sort works by dividing the list into evenly-sized groups, or partitions. Rather than comparing neighbors, the comparisons are across partitions. This means an exchange, when done, may move as far as halfway across the list, speeding up sorting.

A visual example may help. Look at this list:

```
9 8 7 3 5 6 0 1 2 4
```

the first partitioning would divide into two equal groups,

```
9 8 7 3 5 6           0 1 2 4
```

which would then be compared item to item; 9 would be compared to 6, 8 to 0, etc., with the exchanges resulting in:

```
6 0 1 2 4     9 8 7 3 5
```

Now the array is divided further into four groups. The problem here is that ten items don't split evenly into four groups, so one is smaller than the rest:

```
6 0 1    2 4 9    8 7 3    5
```

Now we compare 6 to 2, then 2 to 8, and 8 to 5, exchanging as necessary; then 0 is compared to 4, and 4 to 7. What next? There's no second item in the fourth group to compare to seven, so the sort moves on to comparing 1 to 9, and 9 to 3. The result (with exchanging) now is:

```
2 0 1    6 4 3    5 7 9    8
```

Again we partition into groups of two:

```
2 0   1 6   4 3   5 7   9 8
```

and sort, resulting in

```
1 0   2 3   4 6   5 7   9 8
```

The last pass involves partitioning into single items, and comparing to neighbors, exactly like a single pass of the Bubble Sort. The difference is that only one pass is needed to finish the list.

By starting off moving numbers farther in each exchange, fewer exchanges and comparisons are needed. In this example, only 29 comparisons are needed, versus Bubble Sort's 81, and only 13 exchanges, versus 23 for Bubble Sort. Timewise, it is about 50% faster on 10 items.

The real savings comes in is as the list gets bigger. Unlike the Bubble Sort, doubling the array size does not quadruple the sort time. In fact, it only increases it by approximately 2.8 times. If the time for sorting via Bubble Sort was represented as N^2, with N the number of records, then Shell sort would increase at a rate of N^(1.45). Already faster than Bubble Sort on small lists, the difference in speed steadily increases with list size. As a clear example, we estimated that 2000 records could be sorted by Bubble Sort in about 16 hours; Shell sort does the same task in 13 minutes!

And Still Quicker...

Is this the ultimate sort? Yes and no. The best general-purpose sort is considered the Quick Sort. It works by selecting a number from the list to be sorted, and making two lists up, one with all the numbers in the list that are greater than this chosen value, and another list with the lesser values. Each of these sublists is then processed the same way; a number is selected from the sublist, and each sublist is split into two smaller sublists, one of higher numbers, and one of lower numbers. The result is smaller and smaller lists, each organized according to size. Eventually, all the sublists are one item long, and the sublists' position is also their sorted order. This greatly oversimplifies the sort, but it should give you an idea just how powerful it can be.

The difficulty in creating a Quick Sort on the C64 is in the way our BASIC works. For efficiency, the Quick Sort is usually coded recursively, where the subroutine calls itself as many times as it needs to get the job done (the same function for dividing the list into sublists is then repeated on each sublist). Unfortunately, this can fill the subroutine stack rapidly, something the C64 doesn't have much room for (about 25 subroutines deep will get you an out of memory error). Recoding a Quick Sort into a non-recursive routine using loops adds a great deal of inefficiency to the routine, not to mention complication. In practice, Shell Sort works out as the best general-purpose sorting algorithm for our computers. However, if anyone cares to fashion a BASIC Quick Sort routine, I'd be happy to test it and publish the results and the program.

General Thoughts

Please take notice of the phrase "general-purpose" in the last paragraph. Even a good general-purpose sort can fail in specific cases. For instance, on an array with one item out of place, a Bubble Sort can beat out a Quick Sort. And if not all of the data is accessible, neither sort is effective. An example of this case is when sorting a file from disk. Reading and writing disk data is slow in comparison to computer speeds; adding a sort makes it all the more important to keep disk I/O to a minimum. Several methods of sorting present themselves. Read in one record at a time, sorting them in memory as they are read in. Although the time to find the insertion point is long, it can still be quicker than disk access by a wide margin.

Sort pieces of the file in memory, write each piece out, and then merge them into the final file. This is especially effective for larger files. The disadvantage is all the intermediate partial files take up disk space. Towards the end, you might need up to three times the original file space: the original, the almost finished sort file, and all the partial files that can't be deleted until they are completely read.

Use keys to disk data. Here, each record is read in, and a key is made, along with a pointer to the record on disk; then the record is discarded from memory. This works best if the keys are small, and they can all fit in memory at one time. The keys are then sorted, and the records are reread in and written to a sorted file, based on the order of the keys.

As these examples show, choosing a sort algorithm depends on many things. Trade-offs exists between time and memory, and depend largely on the specific job. Knowing when to use the right algorithm can make the difference between waiting for a job to finish, or moving on to the next one.

Some Sorts Aren't Sorts

As a concluding example of sorting, here's a program that accepts words typed in and sorts them. From the program, can you tell how?

```
100 DIM W$(100)
110 MX=1
120 INPUT "ENTER WORD OR 'X'
TO QUIT";X$
130 IF X$="X" THEN 200
140 I=1
150 IF ( I>=MX OR W$(I)>X$ )
GOTO 170
160 I=I+1 : GOTO 150
170 FOR J=MX TO I STEP -1 :
W$(J+1)=W$(J) : NEXT J : REM
MAKE ROOM FOR STRING
180 W$(I)=X$
190 MX=MX+1 : GOTO 120
200 FOR I=1 TO MX : PRINT
W$(I), : NEXT I
```

So far, we have kept sorting and data access separate. The arrays are first initialized, then sorted. In this program, we keep the words in sorted order as we read them in. Lines 150 and 160 find the place to insert the next word; line 170 makes room for it by copying all other strings up in memory. Since the list is sorted while read in, at the program's end the list is instantly ready to print out. This is important to remember from the program user's standpoint. A little delay in entering words is not too noticeable, but a long wait at the end while a sort is going on will be annoying. Here again, the right choice of algorithm makes things run smoother.

There's a variety of sorts out there, and keeping in mind the purpose, the program needs, and the resources available will help you pick the appropriate one. Keep a general purpose sort on hand for when you need something in a program, and be ready to add a little sort to your routines.

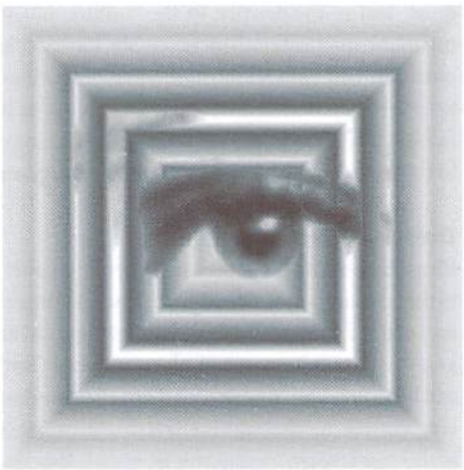
Peripheral Vision

By Jim Butterfield

JOYSTICK, PADDLE AND MOUSE

Most Commodore 8-bit machines from the VIC-20 onwards had game ports: one on the VIC-20, and two on the 64, 128 and Plus-4/ Commodore 16. These ports are officially named "control ports", but are most often called "joystick ports". They can handle more than joysticks, however. They may be fitted with analog devices known as "paddles".

Additionally, these ports may be able to handle a light pen, or even a computer "mouse". For this discussion, we'll concentrate on the basic hardware and interface for the Commodore 64 and 128 here. But there will also be a brief mention of the VIC-20 and the Commodore 16/Plus-4 designs.



The Joystick

Today, the term "joystick" almost always means a digital device. Push it in a certain direction, and a switch clicks over so that the status is signaled to the computer. Five separate signals are delivered: one for each of up, down, left, right, and the fire button. It would be mechanically hard to signal both up and down, but the computer connections are separate and independent.

Combinations such as up-left or down-right-fire can easily be achieved. A game program must test all five signals; when one is detected, there may be others to be found. We should note that some computers may use "analog" joysticks, where the control can be moved slightly to cause a change in the detected reading. This is good for such actions as adding a little more power to your rocket engine, or adjusting the "trim" of your sailplane. Commodore machines can detect this kind of signal, too, but the input connections are called "paddles".

The Hardware

Figure 1 shows the hardware configuration as a programmer might view it. The information arrives by means of "data registers" where it may be tested and used. Figure 2 shows the same thing for the VIC-20. Note that in both cases, the joystick connections overlap with the computer keyboard.

Figure 3 shows the "Atari-style" connector used by the VIC-20 and C64/128. The Plus-4 and Commodore 16 have smaller connectors, to fit the tinier package. They are electrically similar, however, and at one time adapters were available to allow regular joysticks to be interfaced.

Paddles: Analog Stuff

It's been quite a while since I have seen paddles used on Commodore computers, but they may still be available. Meanwhile, enterprising hardware enthusiasts have put these connections to use in other ways.

For example, one enthusiast connected a thermistor to the paddle circuit. A thermistor is a resistor whose value changes with temperature; so as the temperature varied, the computer detected different analog readings. The whole thing was hooked up with a relay that controlled a home furnace. Result: a highly programmable home thermostat system, run from a VIC-20!

Technically, the paddle circuit test resistance by measuring time. The value seen in the register is dependent on the resistance of the paddle that is connected; turning the paddle control increases or decreases the resistance.

The computer detects this by means of timing circuitry: how long does it take for current passing through the paddle to charge a capacitor within the computer? The quicker the charge, the lower the resistance.

Technical types will want to know that the paddle circuitry expects the five volt supply (pin 7) to connect to one end of the paddle resistor, with the other end going to POT X (pin 9) or POT Y (pin 5). Also, a typical paddle ranges in resistance from 470K ohms maximum down to a few hundred ohms minimum (not down to zero!)

The Light Pen

The light pen is a device that plugs into port 1. When the light pen is pointed at a location on

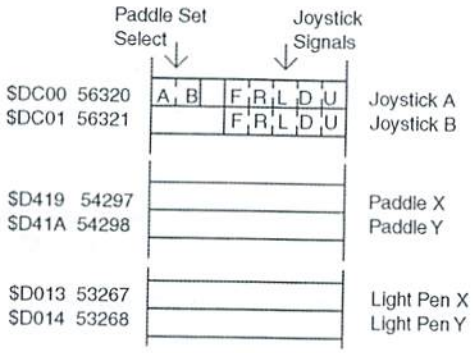


Figure 1: Joystick and Paddle interface registers for the Commodore 64 and 128. Note that the joystick registers are also used for keyboard sensing.

the screen, the computer can sense its location. This makes it good for such applications as selecting icons or multiple-choice "gadgets" from the screen. However, a light pen may not be precise enough for detailed graphics work; and it tends to work better when pointed at more brightly-lit areas of the screen.

When a light pen is placed near the screen, it will sense the instant that the "raster" passes by, and send a signal to the computer video chip. The chip works out where the light pen is pointing based on the time at which this signal arrives. The light pen signal is connected using one of the circuits in the keyboard. The keyboard will not work fully when a light pen is connected - unless there's a switch on the pen.

You can read the light pen position on a 40-column screen by peeking addresses 53267 and 53268 for horizontal and vertical coordinates. The locations give you horizontal and vertical positions, respectively. The following brief program will show how things work.

```
1 H=PEEK(53267) : V=PEEK(53268)
2 PRINT CHR$(19);STR$(H);STR$(V
);"  "
3 GOTO 1
```

As you move the light pen, this program will show the coordinates at the top of the screen. They will change as you move; the horizontal values will range from about 30 to 190, the vertical goes from about 50 to 250.

On the Commodore 128, you may use the PEN() function to detect the light pen location. For a 40-column screen you could change line 1, above, to read H=PEN(0) and V=PEN(1).

Using the light pen with the 80-column screen of the C128 is somewhat more complex. The 8563 Video Controller will signal when it has "latched" the light pen readings into its registers, and the program is required to test this latch signal by using function PEN(4). A typical test program follows.

```
1 DO UNTIL PEN(4):LOOP
2 H=PEN(2) : V=PEN(3)
3 PRINT CHR$(19);STR$(H);
  STR$(V);" "
4 GOTO 1
```

Tablets and Mice

Graphics tablets are a good substitute for light pens in many applications. They tend to be more precise, since they send their location information via the paddle lines.

A mouse is a well-known computer accessory, but it was a novelty back in the early 1980s. Commodore produced a couple of these, and there have been several from other sources.

The Commodore 1350 was simply a joystick masquerading as a mouse. Push the mouse upwards, and the computer received a "joystick up" signal, and so on. At first this seems mouse-like. But it soon becomes obvious that the computer doesn't detect the speed at which the mouse moves, only the direction.

Even so, this primitive mouse had some advantages. Since it substituted directly for a joystick, it could be used immediately with joystick programs. And when Commodore introduced their more sophisticated 1351 mouse, they retained the joystick mode as an option: hold the buttons down as you turn the power on, and the 1351 behaves like a 1350.

The 1351, in its standard mode, sends information about its travels by means of the paddle interfaces. As the mouse moves up and down, the vertical paddle reading changes; a similar thing happens for horizontal movement.

Unlike a light pen or graphics tablet, the 1351 mouse has no concept of where the edge of the screen might be. So when a paddle coordinate goes up to 255 and the mouse keeps traveling, the value rolls over to 0 and keeps going. Similarly, a paddle value that goes down to zero will roll over to 255 as the mouse keeps moving. The program reading the mouse must be prepared to cope with this, and make some decisions about how to handle edge-of-screen situations.

Test Programs and Techniques

The following programs have several possible uses. First, you can examine them to see how to go about coding joystick and paddle activities. Secondly, they are a good way to test your interfaces. The 6526 CIA chips that handle the joystick and other buttons are easily damaged, so it's useful to have a program to test that the port is operational.

Here's the test program for the C64.

```
100 PRINT CHR$(147);CHR$(142)
110 PRINT"JOYSTICK/PADDLE TEST"
120 PRINT "PRESS <F1> TO STOP"
130 DATA F,R,L,D,U
140 DATA 16,8,4,2,1
150 DIM C(5),B(5)
160 FOR J=1 TO 5:READ C$:C(J)=A
SC(C$):NEXT J
170 FOR J=1 TO 5:READ B(J):NEXT
J
180 PRINT CHR$(19):PRINT:PRINT
```

The loop from line 200 to 360 takes us across the two ports. Variable G switches in the paddles for the corresponding port.

```
190 G=64
200 FOR P=0 TO 1
210 PRINT
```

We shut off the IRQ interrupt in line 220, and it will be restored later on in line 280. This allows us to set the paddle port and test the joystick ports without having the keyboard get in the way.

```
220 POKE 56333,127
230 R=PEEK(56321-P)
240 POKE 56320,G
250 G=G+G
260 X=PEEK(54297)
270 Y=PEEK(54298)
280 POKE 56333,129
```

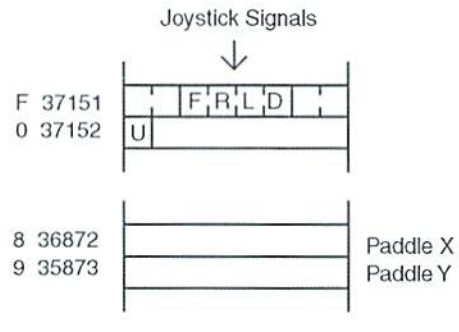


Figure 2: Joystick and Paddle interface registers for the VIC-20. The register at $9120 is also used for keyboard testing.

The loop from line 290 to 320 scans for the five digital signals from the port: up, down, left, right, fire. Each may be detected with the AND bit mask; a character (U,D,L,R,F) is printed for each one found.

```
290 FOR B=1 TO 5
300  C=C(B):IF R AND B(B) THEN
C=32
310 PRINT CHR$(C);
320 NEXT B
330 PRINT " PORT:";P+1;"PADDLES
:";
340 PRINT RIGHT$(" "+STR$(X),4)
;
350 PRINT RIGHT$(" "+STR$(Y),4)
360 NEXT P
370 GET X$:IF X$="" GOTO 180
380 IF ASC(X$)<>133 GOTO 180
390 END
```

The program can be terminated with the RUN/STOP key. For neatness, the code also allows the F1 function key to do the job.

The test program for the Commodore 128 is written in a somewhat different way. The JOY and POT functions are used liberally, which makes the program much shorter.

One caution, however. The Commodore 128 Reference Guide says that Basic doesn't give really accurate paddle readings; not with POT(), not with PEEK(). The manual suggests the use of machine language to read the paddle registers. I'm not sure why this is so.

```
100 PRINT CHR$(147);CHR$(142)
110 PRINT"JOYSTICK/PADDLE TEST"
120 PRINT "PRESS <F1> TO STOP"
130 KEY 1,CHR$(133)
180 PRINT CHR$(19):PRINT:PRINT
200 FOR P=1 TO 2
210 PRINT
220 P1=P*2-1
230 J=JOY(P):Y=32
240 IF J>127 THEN J=J-128:Y=70
250 PRINT RIGHT$(" "+STR$(J),3)
;CHR$(Y);
260 PRINT " PORT";P;"PADDLES:";
270 FOR B=P1 TO P1+1
280 X=POT(B):Y=32
290 IF X>255 THEN X=X-256:Y=66
300 PRINT RIGHT$(" "+STR$(X),4)
;CHR$(Y);
310 NEXT B
320 PRINT
360 NEXT P
370 GET X$:IF ASC(X$)<>133 GOTO
 180
380 END
```

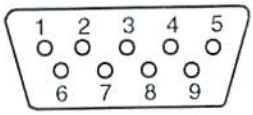


Figure 3: Joystick connector used on the VIC-20 and Commodore 64/128.

PIN	FUNCTION
1	Joy 0
2	Joy 1
3	Joy 2
4	Joy 3
5	Pot Y
6	*Fire Button
7	+5V 100ma max.
8	System Ground
9	Pot X

* On the 64 and 128, pin 6 on port A is also used to connect a "light pen" input which may be used in conjunction with the 40-column screen.

Where the connector has a metal outer shield, that too is grounded; a source of problems if you try plugging in such a connector to a live computer.

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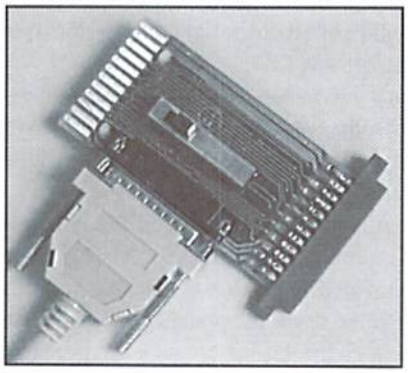

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ASSEMBLY LINE

INPUT AND A LITTLE ARITHMETIC

Jim Butterfield

Last time, we obtained user input by means of a call to the GET subroutine at $FFE4. This time, we'll do the same thing in a different way by means of subroutine INPUT at $FFCF. GET is often called GETIN, and INPUT is often called CHRIN, but the addresses are the same on all Commodore 8-bit machines.

We'll also do a little elementary arithmetic. It seems a shame that when we have a nice binary number ready, we can't just send it out to be printed. But we have to change it to printable characters first. Our programming task will do this in a simple way.

INPUT versus GET

You may be familiar with the INPUT and GET statements used in BASIC. If so, you know that INPUT takes a whole line from the screen, and waits until that line is ready. GET, in contrast, takes a single character from the keyboard buffer, and if there is no character waiting, GET returns immediately with "nothing". There are also visual differences: INPUT supplies a cursor, and echoes what is typed to the screen; GET has neither a cursor nor a screen echo.

You'll find similar action in the machine language calls. As Figure 1 illustrates, GET takes from the keyboard buffer, but INPUT takes from the screen. GET never waits, but INPUT will wait until a RETURN signals that the screen line is complete.

Which is better? GET would need extra code to echo the user's keystrokes to the screen, and even more code to create a form of cursor. Want to honor the DELETE key and make it do the right thing on the screen display? More work again, if you're using GET.

INPUT has only one major fault, but it's a big one: until RETURN is pressed, your machine language loses control of the system. Everything stops until the input line is ready. You can't time out if the user is too slow; you can't prevent the user from moving the cursor to a new line or even clearing the screen; and, your program can't do anything else while waiting for input.

Generally, I prefer GET, which gives me full control. But INPUT is sometimes more convenient. I can preprint a suggested response on the screen (the user can type over it, or just press RETURN to accept the preset input). Cursor movements and insert/delete keys can allow the user to edit a line before sending it to the computer.

INPUT Notes

The first time you call the subroutine at $FFCF, you'll lose control until the user presses the RETURN key. Then your program will return with the first character in the A register. Keep calling the INPUT routine, getting characters from the line, until you receive a value of $0D (RETURN).

I recommend you get the whole line right away. Store it and work on it later if you wish. If you do any other input or output operation before you've got it all, you'll lose the rest of the line.

Unlike the INPUT statement in BASIC, no prompt character is printed. You may choose to print your own prompt in advance (we'll do this in the following program.) When the Kernal sees that the cursor is not in column 1, it notes this and will deliver only those characters typed in the remainder of the line.

When INPUT is completed, and you receive a RETURN character, it's a good idea to print it, via the usual call to $FFD2. That will move the cursor to the start of the next line. But don't print RETURN earlier! As mentioned, that would cause you to lose the rest of the input line.

A Little Arithmetic

We'll count the characters as we receive them in our program. As usual, we can use X or Y as a counter, incrementing the value with INX or INY each time we see an input character. The counter also serves as an index register, to help us put the characters away into a buffer. When we have finished, our objective is to print how many characters were received.

The index register (X in the program below) contains the count as a binary number. We must change this into printable characters. For example, if we had received lucky 13 characters and tried to print this value by slipping it into register A and calling the output routine at $FFD2, we'd simply print CHR$(13)—a RETURN character! Somehow, we have to change that binary value into two characters, 1 and 3, and then print them.

Assuming that we don't get over 99 characters, it's easy to see that we can do the job by dividing by ten. Divide thirteen by ten, for example, and we get a quotient of one—that's our first digit—and a remainder of three, our second digit.

But we don't have a divide instruction available on our computer! No matter. We can get the same effect by repeatedly subtracting ten until the remainder is less than ten. There are slicker division routines available, but this one is easy to follow and will do the job. Let's track the coding.

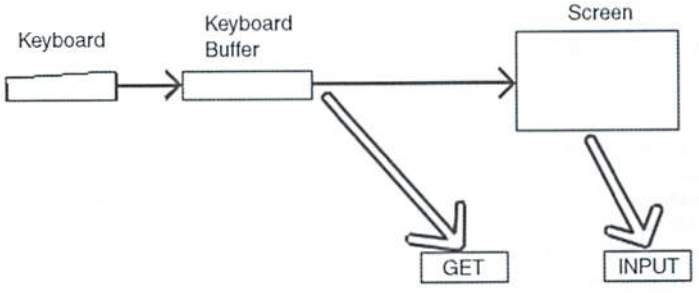

Figure 1: The GET Function ($FFE4) grabs characters from the keyboard buffer before they reach the screen; if no character is waiting, GET returns immediately with binary zero. The INPUT function ($FFCF) takes a line from the screen; it waits until RETURN is pressed so that it knows the line is complete. Then, it accepts the screen characters one at a time until the whole line has been received.

The Program

We'll start our program at address hex 2000, decimal 8191. This address is available on virtually all Commodore 8-bit machines. So crank up whatever machine you've got, load in the Machine Language Monitor (if it's not built in), and start typing.

```
2000 LDX #$00          (character count = 0)
```

Here's the INPUT loop that grabs the whole line.

```
2002 STX $2100         (save X)
2005 JSR $FFCF         (call INPUT)
2008 LDX $2100         (restore X)
200B STA $2101,X       (put character in buffer)
200E INX               (add to count)
200F CMP #$0D          (is it a RETURN?)
2011 BNE $2002         (if not, get some more)
2013 JSR $FFD2         (loop finished, print RETURN)
```

Now for the arithmetic. Register Y is the "tens" counter.

```
2016 LDY #$00          (start at zero)
2018 DEX               (don't include RETURN)
2019 TXA               (get the count)
```

After a comparison, command BCC (Branch Carry Clear) means "Branch if Less"—in this case, if less than ten.

```
201A CMP #$0A          (less than ten?)
201C BCC $2023         (if less, we're finished)
```

When we find a value greater than ten, we add one to the tens counter in Y, subtract ten, and go back for another comparison. Under the circumstances of this program the BCS command will always branch.

```
201E INY               (add to tens count)
201F SBC #$0A          (subtract ten)
2021 BCS $201A         (always go back and compare
                       again)
```

We get to this next point with the remainder in A, and the tens count in Y. They must both be converted from binary to ASCII—the ORA command will do this efficiently. And we must swap them around so that they will print in the correct order.

```
2023 TAX               (stash the remainder)
2024 TYA               (get the tens count)
2025 ORA #$30          (convert to ASCII)
2026 JSR $FFD2         (print it!)
202A TXA               (now the second digit)
202B ORA #$30
202D JSR $FFD2
2030 RTS               (back to BASIC)
```

Previews and Tricks

The above example looks ahead in certain areas. It uses instructions and coding that we haven't introduced properly yet. No problem; we'll get to these items in the future. Meanwhile, here are a few comments.

Subtracting

When we have time to deal in detail with the SBC (subtract) command, you'll learn that it comes with rules. Rule 1: before doing a subtraction, make sure the Carry flag is set; the command SEC, Set Carry, is often used. If the carry is not set, you have a "borrow" situation, and you might subtract one more than you planned. In our program, can you see why we can be confident that the Carry flag is set at the time the SBC instruction is executed?

Subtraction rule 2: after doing a subtraction, the Carry flag tells us if the subtraction needed a "borrow" to do its job. The Carry flag will be set if there is no "borrow", that is, a normal subtraction has taken place. As noted, you can be sure that this flag will always be set in our program situation. Again, can you see why?

Another assumption that I noted in the code: after a comparison operation (CMP in this case, but CPX and CPY follow the same rules), BCC, "Branch Carry Clear", will be equivalent to "Branch if Less Than", and BCS, "Branch Carry Set" will mean "Branch if Equal or Greater Than". This is true whenever we compare unsigned numbers. After a comparison instruction, stay away from BMI, "Branch Minus", and BPL, "Branch Plus"—they will not behave the way you expect.

The last extra item is the use of the logical operator, ORA (OR into A). The OR operation is used to turn bits on. In this case, it's the ideal way to change a binary value in the range 0 to 9 into the corresponding ASCII character, ready for printing. By OR-ing with hex value 30, we stick two extra bits over the binary number, converting it to the proper value.

The BASIC Program

If you'd just like to enter this program in BASIC and see it work, the following lines will do it for you. If you have put your program directly into memory at addresses $2000 to $2030, you should still enter lines 300 to 340, which will give you a simple BASIC driver that connects to your program. Note that I have arranged to put a prompt and some "canned" characters on the screen for you. Pressing RETURN will have the same effect as typing XXX.

I encourage you to try the tricks a user might, deliberately or by accident. Type something in and then edit it with the cursor keys. Clear the screen and see what happens. Move away from the input line, and then perhaps move back before pressing RETURN. You'll get a feel for both the versatility of the INPUT call, and the loss of control which comes along with it.

```
100 DATA 162,0,142,0,33,32,207,255,174,0,33
110 DATA 157,1,33,232,201,13,208,239
120 DATA 32,210,255,160,0,202,138,201,10
130 DATA 144,5,200,233,10,176,247,170,152
140 DATA 9,48,32,210,255,138
150 DATA 9,48,32,210,255,96
200 FOR J=8192 TO 8240
210 READ X:T=T+X
220 POKE J,X
240 NEXT J
250 IF T<>6009 THEN STOP
300 PRINT "TYPE SOME STUFF ON THE LINE BELOW"
310 PRINT "MAGIC: XXX";CHR$(145)
320 PRINT "STUFF: ";
330 SYS 8192
340 PRINT " CHARACTERS SEEN!"
```

CHECKSUM

Commodore World's Program Entry Checking Program and Tips on Entering Programs from this Magazine

CHECKSUM is a program that proofreads your typing when you enter a listing from the magazine. It assigns a numerical value to each character that you type, adds up the values of the line you typed and displays the sum. (Checksum, therefore, means that it checks your typing by summing the characters.) It also verifies that you have typed the characters in the proper order. (Checksum won't tell you if you miss a line of code entirely, so verify that yourself.) Checksum runs "in the background" when you type in lines of program code. Whenever you type a line and press RETURN, Checksum will display a value. Compare that value to the value published next to the line of code in the magazine. If the numbers match, you've typed the line correctly. Simple.

Typing in CHECKSUM

First, type in Checksum carefully from the listing on this page. Be sure to press RETURN after every line to enter it into memory. Once you have typed the program, *save it*. In fact, save it a few times while you're typing, just to be safe. (This is good advice whenever you type in a program. I usually change the name each time I save; for example, Checksum1, Checksum2, and so on.) Double-check your work, making sure that you've typed in every line and that you've pressed RETURN after every line you've typed. If you make errors when typing in Checksum, a test run of Checksum will tell you which line is incorrect. (This safety feature works only in the Checksum program itself, and does not apply to any other listings in the magazine.) Whenever you find a typing error (in any program listing), fix it, press RETURN to enter the change, save the program again and try another run. Repeat this process as often as necessary. Important tip: Don't get discouraged if the program won't run. Be patient. Be thorough. It will work eventually. You'll know your Checksum is ready when you see the line:

```
TO TOGGLE ON OR OFF, SYS XXXX
```

Entering Programs Using CHECKSUM

When you're ready to type in your first listing from the magazine, load and run Checksum. Make a note of the number that is displayed on the screen (49152 for the C-64; 3328 for the C-128). To activate and deactivate Checksum, type SYS followed by that number, then press RETURN. You need to have Checksum active whenever you're typing in a listing. Checksum must be deactivated, however, when you run the new program. The next step is typing in a new program listing as it appears in the magazine.

As you begin, you'll notice that to the left of the start of each line is a number. Don't type this number in: It's simply the Checksum value. Stop typing at the end of the program line and press RETURN. If you've typed the line correctly, the number displayed on the screen will match the Checksum value. If the numbers don't match, you've made a mistake. Check the line carefully, make your changes and press RETURN. The computer won't know you've made a change unless you press RETURN on the changed line to enter it. A few type-in hints: The Checksum does not verify blank spaces in the program lines unless they are within quotation marks, because adding or omitting such spaces will not affect the operation of the program. The exception to this is hexadecimal Data statements. These are the Data statements, such as this one, that don't have commas:

```
100 DATA 12345678901234567890*123456789012345
67890*12345678901234567890*
```

In statements such as these, you must have one space between the word DATA and the numbers that follow. Checksum will not catch that error.

Special Key Combinations

As you type, you may be confused the first time you see curly braces {}. These braces mean "perform the function explained within." For example, {22 SPACES} means that you need to press the space bar 22 times. Don't type the braces (you can't, of course, because there are no curly braces in the Commodore character set). Here are some other common examples:

{CLEAR/HOME}	hold down the SHIFT key and press the CLR-HOME key.
{2 CRSR DN}	tap the cursor down key twice.
{CTRL i}	hold the CONTOL key and press the I key.
{CMDR t}	hold down the COMMODORE key and press the T key.

Continue typing in your program, saving often and checking each checksum value with the one in the magazine, until you've finished the listing. Phew! So now you're ready to run your program, right? Not quite. First, save it. Second, deactivate Checksum by typing SYS followed by 49152 for the C-64 or 3328 for the C-128. Now you can run. Don't be discouraged if you still get an error. It happens. Use Checksum faithfully. Be patient. Be thorough. It will work eventually.

CHECKSUM

```
100 rem cw checksum 64/128
110 mo=128:sa=3328
120 if peek(65533)<>255 then mo=64:sa=49152
130 i=0:ck=0:ch=0:ln=300
140 for k=0 to 16
150 for j=1 to 10
160 read b:if b>255 then goto 280
170 ch=ch+b:poke sa+i,b:i=i+1
180 next j
190 read lc:if lc<>ch then goto 280
200 ch=0:ln=ln+10
210 next k
220 pokesa+110,240:pokesa+111,38:pokesa+140,234
230 printchr$(147):print"cw checksum";str$(mo):print
240 print"to toggle on or off, sys";sa:if mo=128 then 270
250 pokesa+13,124:pokesa+15,165:pokesa+25,124:pokesa+26,165
260 pokesa+39,20:pokesa+41,21:pokesa+123,205:pokesa+124,189
270 pokesa+4,int(sa/256):sys sa:new
280 print"you have a data error in line";ln;"!":end
290 rem do not change these data statements!
300 data 120,162,24,160,13,173,4,3,201,24,884
310 data 208,4,162,13,160,67,142,4,3,140,903
320 data 5,3,88,96,32,13,67,152,72,169,697
330 data 0,141,0,255,133,176,133,180,166,22,1206
340 data 164,23,134,167,132,168,170,189,0,2,1149
350 data 240,58,201,48,144,7,201,58,176,3,1136
360 data 232,208,240,189,0,2,240,42,201,32,1386
370 data 208,4,164,180,240,31,201,34,208,6,1276
380 data 165,180,73,1,133,180,230,176,164,176,1478
390 data 165,167,24,125,0,2,133,167,165,168,1116
400 data 105,0,133,168,136,208,239,232,208,209,1638
410 data 169,42,32,210,255,165,167,69,168,170,1447
420 data 169,0,32,50,142,169,32,32,210,255,1091
430 data 32,210,255,169,13,32,210,255,104,168,1448
440 data 96,104,170,24,32,240,255,104,168,96,1289
450 data 56,32,240,255,138,72,152,72,24,162,1203
460 data 0,160,0,32,240,255,169,18,208,198,1280
```

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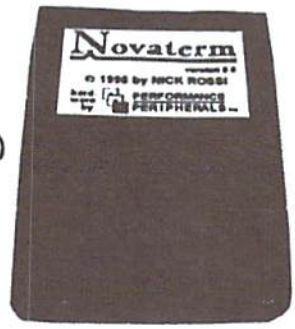

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