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COMMODORE WORLD
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FROM THE EDITOR

EXCITING TIMES?

With the world around us constantly changing, we too must accept change from time to time, or face possible extinction. This applies to many things in life, not just computers.

However, to avoid the kind of upgrade cycles that keep other platforms spiraling out of control of the user, we need to make wise decisions about our changes.

In the not-too-distant future, some new and exciting items will arrive in the Commodore software arena. There will be two new GEOS updaters vying to become the new standard in that arena. Several individuals are working on Internet-based applications of similar types, and again, there may be some competition there as well to become the 'standard' for our platform.

Regardless of which program does what and which is standard and which isn't, one thing is certain: It will be far more exciting to have a choice than not having these applications to begin with.

Meanwhile, get a head start on finding out about the new GEOS updaters due out soon by reading this issue's coverage of Wheels and MP3. And also be sure to check out 816 Beat to get the scoop on the new SuperCPU that has begun shipping from CMD.

Oh, and get excited, because I believe that this year you'll find there will be plenty of reason to do so!

Doug Cotton
Editor

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This mouse-driven card solitaire is also one of Maurice's best.

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Using Cameron Kaiser's WORLD MAKER system, John invites you into the Charles Mansion, where no good deed goes unpunished.

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Number-teasers, word-puzzles and brain-stumpers a-plenty! Plus, Knees' monograph on mystery mores.

Legal Beagle III
Generate some more legal documents which you can customize for your own use.

A Night On The Town
Take a musical trip from the quaint eateries of the outer city into the heart of darkness we call "uptown".

Room - 4k Contest Winner
A small demo that gives you a glimpse of what the world of DOOM is like.

Twin Terrors
For one or two players, this exciting game offers 99 levels of jumping and shooting.

Gershwin Jukebox
Eight memorable tunes by George Gershwin, including Rhapsody in Blue (in three movements), the three Preludes, and Swanee, made famous by Al Jolson.

Quicksmith Music
31 songs by musicologist Dave, all converted into the QUICKSMITH format by Lee Novak.

Clip Joint #2
A geoPaint document chock full of attractive images just ripe for clipping.

Geos Disk Tools
Ten tools for the Geos environment that will make your navigation faster and easier. All are well explained by our Geos Man About Town.

Diskovery
Your editor confronts another crisis, mourns a prolific C-64er, describes a new product, and introduces a Euro company.

Jeff's Soapbox
Jeff mediates (or aggravates?) the battle of the operating systems.

LOADSTAR LETTER #54

Bill Gates Attacked By Professional Pie Throwers In Belgium

Wheels/GeoFAX Sweepstakes

An Interview With Maurice Randall

The Loadstar Letter is published monthly. It's the biggest, most informative, and authoritative newsletter available for the Commodore 64 and 128

Centsible Software
A list of 50 commercial "in the box" programs from the world's largest CBM software store.

Modern Printers
Looking for a new printer for your C-64/128? Read this first!

Master Of Trades
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ON THE HORIZON

COMMODORE AND COMPUTER INDUSTRY NEWS

Dialogue 128 Terminal Software Freely Available

In a recent announcement, Gary Farmaner, author of the popular Dialogue 128 terminal program declared the package free for distribution. Farmaner cited several reasons for the decision, which included a lack of time to devote to distributing the program commercially or provide adequate support.

While the program may now be freely distributed, Farmaner has opted to retain all rights to the software, and has placed some specific limitations on the distribution, indicated in his release statement:

> "I, Gary Farmaner, sole author of the program Dialogue 128, do hereby authorize the release of the program Dialogue 128 and any accompanying documentation, to freeware, NON-COMMERCIAL distribution.
>
> THIS IS FREE SOFTWARE.
>
> Individuals are encouraged to give away, and post to software distribution sites, copies of the software and any electronically captured form of the documentation, as long as this notice is included.
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> Commercial interests are permitted to distribute the program and documentation as long as this notice is included, and NO CHARGE is made beyond reasonable media and duplication costs (at most $2 for diskette, and $3 for printed documentation).
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> I retain full copyright on the software and documentation. The software and documentation are NOT being released to the public domain. I retain the right to release commercial updates at at future date.
>
> The software is released AS IS, without warranties, guarantees, or support of any kind.
>
> There is no charge for this software. However, if you do find it useful I would appreciate reading about it. Drop me a line at: dialog@turing.toronto.edu"

Commodore 8-bit Rights Not With Gateway 2000

A news item in Commodore World Issue #21 incorrectly stated that the Commodore 64 rights had been purchased by Gateway 2000, along with rights to the Commodore Amiga. Commodore World columnist Jason Compton has now confirmed with Gateway that this information is incorrect. The rights to the Commodore 64, 128, and many of the other 8-bit products apparently went to Commodore BV., a Netherlands-based PC manufacturer that was previously a division of the now bankrupt German company Escom. Commodore BV (http://www.commodore.net) is now owned by Tulip Computers, another Netherlands-based PC manufacturer.

SuperCPU 128 Shipping

Creative Micro Designs (CMD) has recentlycompleted work on the SuperCPU 128, their 20 MHz accelerator cartridge for the Commodore 128 which provides acceleration for both the 128 and 64 modes. The product was released in early March, marking the first time an accelerator has been shipped for the Commodore 128's native mode.

CMD also announced that the new board design used in the SuperCPU 128, dubbed the SuperCPU v2, is now being used in the SuperCPU 64, replacing the original board designed for that product. The new hardware and firmware provide additional capabilities not available in the older version. CMD notes that because of the new improvements, many programs run faster without making modifications to the programs themselves. CMD has also indicated that work is being done on a possible upgrade for older SuperCPU 64s that will give the older models all the capabilities of the new version.

Centsible Obtains Rights To Maverick

The rights to several programs previously produced by Software Support International have been recently purchased by Centsible Software (1-616-471-1089). Among the titles are the 1541/1571 Disk Drive Alignment and Amiga AmiDrive Alignment programs, Maverick 64/128 and Maverick Amiga.

Centsible has announced that they plan to have the Maverick archiving software for the Commodore 64/128 available for putchase by the end of April of this year.

Update For GeoFAX Available

Maurice Randall has recently announced that version 2.1 of geoFAX is now shipping. The new version fixes several problems with that have surfaces over the last few months.

An updater for registered owners of version 2.0 can be obtained either by sending their name, Email address and geoFAX ID number in Email to Maurice Randall (arca93@delphi.com) or by contacting Maurice via his support BBS. Alternatively, the patch program may also be obtained on disk by sending Maurice a blank formatted 1541 disk in a stamped self-addressed mailer (be sure to provide ample postage and your geoFAX ID number).

Users who have V1.5—1.7 may purchase an upgrade for $15.00 plus shipping and handling ($4 for North America, $6 for all others).

Desterm 3 Beta Released

Matthew Desmond, author of the Desterm terminal sofware, has released a beta test version of Desterm 3. The new version offers several features not previously available in the program, including Zmodem transfers and Turbo232 support. The new version also now uses standard disk routines, making it compatible with storage devices like RAMLink and RAMDrive.

Early reports seem to indicate that numerous bugs exist in the beta release, and Desmond warns that several features found in previous releases have not yet been ported to the new version. Patches for at least two bugs in the program have been recently posted on Desmond's web site (http://www.ionline.net/~mdesmond/desterm.html), where the beta itself can also be obtained.

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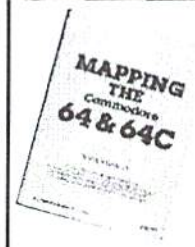

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COMMODORE TRIVIA

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!

Jim Brain
Brain Innovations, Inc.
10710 Bruhn Ave
Bennington, NE 68007
j.brain@ieee.org

COMMODORE TRIVIA #21 QUESTIONS

$180 Most people know what CPU is in a Commodore disk drive, but what CPU powers the venerable CBM 1525 printer?

$181 What is the maximum number of characters per line on a CBM 1520?

$182 Commodore rarely manufactured its own printer mechanisms. Who's mechanism did Commodore use in the DPS 1101?

$183 What is unique about the DPS 1101 printer?

$184 Which was the first Commodore modem with DTMF dialling capabilities?

$185 Which was the last Commodore 8-bit peripheral drive developed?

$186 What is the maximum size of RAM available for use for program storage on an expanded VIC-20

$187 One of the most poular magazines for computers in the 1980's was COMPUTE! What Commodore content magazine did it give birth to?

$188 In a strange twist of irony, COMPUTE! was itself descended from a Commodore content magazine. Which one?

$189 COMPUTE! underwent a name change very shortly after introduction. What subtle change was made to the name?

$18A How were LOADSTAR and Commodore Microcomputing-Power/Play once connected?

$18B What is the fastest Commodore ever clocked a 6502 or derivative CPU in a machine?

$18C Name one byte that yields the same character when printed and poked to a Commodore screen.

$18D Quick, which chr$ value flips to uppercase/lowercase mode?

$18E Quicker, which chr$ value flips it back to uppercase/graphics?

$18F How do you get INPUT to not display a question mark?

$190 In reference to Commodore, what does TOI stand for?

$191 Name two values that, when poked to the screen, will yield the identical character appearance.

$192 What chr$ codes lock out and re enable the shift/commodore keyboard flip from uppercase to lowercase on the VIC-20?

$193 What chr$ codes lock out and re enable the shift/commodore keyboard flip from uppercase to lowercase on the C64?

$194 What chr$ codes lock out and re enable the shift/commodore keyboard flip from uppercase to lowercase on the C128?

$195 On CBM machines prior to the VIC-20, what chr$ code outputs the same character as chr$(44), the comma.

$196 Is the character described in $195 of any use?

$197 The speed of Commmodore BASIC increased dramatically after the first OS upgrade in 1979. Why?

$198 COMAL, a programming language available for Commodore computers, was created by whom?

$199 At the 1980 COMDEX, Commodore PETs proved instrumental during a crisis. What happened?

$19A Who designed the PET/CBM 8032 computer?

$19B What was the "cursor gone out to lunch" bug in the first PETs?

$19C On a PET/CBM (early models), what will "POKE 14,1" do?

$19D What version of BASIC would not utilize disk drives?

$19E Who is Lyman Duggan and why is he important?

$19F Jim Butterfield notes to me that he received plenty of help in creating the first PET memory map (Q $0D8) from the Sphinx group, who published critical information in their early newsletters. How did Commodore influence the name of the group?

COMMODORE TRIVIA #20 ANSWERS

$160 Variables can indeed be longer than 5 characters.

$161 The variable name fails becase the BASIC keyword "DEF" in it.

$162 As long as the maximum command line length. Theoretically, using automated code generation, you can get a variable name that is just shy of 255 characters in length.

Oh, and Abacus wrote the offending book.

The Commodore LCD Computer system, much like the Commodore 65, was a product that never reached the market. Do you remember this pint-size CBM machine?

$163 72 keys, including 8 function keys and 4 separate cursor keys.

$164 Liquid Crystal Display.

$165 Yep, A 300 bps auto dial/auto answer modem.

$166 As referenced in $158, there are 8 integrated programs:

Word Processor
File Manager
Spreadsheet
Address Book
Scheduler
Calculator
Memo Pad
Telecommunications Package

$167 4 AA alkaline batteries.

$168 5 pounds.

$169 3.6. It contained all of Basic 3.5 plus a few extras.

$16A An HP bar code reader.

$16B The 65C102 CPU. This CPU was built using the 65C02 core from Western Design Center, who licenses the popular 65C816S CPU as well. CBM licensed this chip at little or no cost as a result of a lawsuit settlement between WDC and CBM over 6502 architecture patent infringements.

$16C Centronics Parallel (printer) port, and an EIA-232 (RS-232C) port.

$16D 32kB of battery backed RAM.

$16E 480 x 128 or 61440 pixels

$16F 96kB of ROM, which held the OS and the integrated programs.

$170 The following text is centered on either the 40 or 80 column screen:

```
COMMODORE BASIC V7.0 122365 BYTES FREE
(C)1985 COMMODORE ELECTRONICS, LTD.
(C)1977 MICROSOFT CORP.
ALL RIGHTS RESERVED
```

$171 As shown above in Q $170, 122365 bytes.

$172 Column 70.

$173 The printer is offline. Put the printer on-line, and the floppy will operate correctly.

$174 One brute force way:

While in the machine language monitor, type:

```
m f63f5 f640b
```

$175 235

$176 Tri Micro wrote the code, and created a version for the C64. It turns out that the 3+1 software included with the Commodore Plus/4 was originally designed to be but one of the many choices for bundled software with the 264. When the focus changed, 3+1 became the only software bundled, and some assumed Commodore had written it. (Ref. RUN April 1985:43)

$177 David Simons (Ref: Commodore Power/Play April/May 1985:56-7)

$178 Hewlett Packard. (Commodore Power/Play April/May 1985:56)

$179 114. (P/P Apr/May 1985:57)

$17A Renumbering GOTOs and GOSUBs when renumbering a program.

$17B When merging over 255 records in the Word Processor, a printout might stop early int the file and continually reprint a single record, or entering one record might trash another record. (RUN April 1985:43)

$17C The 6502. The change in number owes more to a change in manufacturing process than anything else.

$17 80. (RUN November 1984:37)

$17E Row 2 Column 2. (RUN July 1984:109)

$17F Column 2-4 spell out CBM. (RUN July 84:109)

C64 Alive—A Report from the European Hobby & Electronic Show

by Malte Mundt

November 1997, Germany, Stuttgart: It's time for the annually show called "Hobby&Electronic". I was there with the German magazine "GO64!" to show the world that the C64 is alive.

In the hall where we were located, we got the biggest and best located stand! People simply could not miss us. On Tuesday, the 4th of November (the day before the show began) the halls were opened for the exhibitors. Amazed by the dimensions of the halls and our area, we began to prepare for the show. We had a mixture of six C64s and128s with us, a C65, two SX-64s and a C64GS game console.

Wednesday morning: The doors of the show were opened. Our stand looked really great: Seba, member of the group Plush (who also writes for GO64! from time to time) had prepared gigantic GO64! and CMD logos, and one wall featured original Commodore advertising sheets and an original VIC-20 machine.

The front of the stand featured our two greatest attractions: A mega-equipped C64 system that included a SuperCPU, RAMLink, REU, 1 GB CMD HD and a CD-ROM drive. Then, next to lots of GO64! issues, we had large television with a SuperCPU and FD-2000 connected to it. Here we showed a demo-level of the upcoming SuperCPU shoot'em up, *Metal Dust*. A powerful amplifier and gigantic speakers spread the game's superb digi-music throughout the hall. Left of it two standard C64s were set up, on which we continously showed different demos.

We expected to talk with different kinds of people. Naturally there would be PC users bothered by the fact that there are still those who do not bow to the Wintel-empire, and there would be other PC users who would find our display interesting, but wouldn't set up their C64 again. But those we were there for were the Commodore-lovers who were not aware that new hardware and software is being made.

As we learned to recognize these three kinds of people, we had great fun fooling with the disciples of Bill, who wanted to convince us to finally trash our old machines. Those poor guys simply were unable to understand what is so special about a Commodore.

Many people were positively surprised when they spotted our stand. They remembered the old times, when games were fun. Often we explained to someone what is now available for the C64/128. While 3.5" drives were known to some ("Ah yes, such a 1581-drive..."), people were more stunned over the hard drive ("This HD-20, I used to have too!" - "Well, but now there is 1 GB inside!" - "P-P-Pardon?"). Even more were amazed at seeing the CD-ROM drive. Obviously the CD still is the symbol for the "modern multimedia age", and the visitors were shocked to see one connected to a C64.

Since *Metal Dust* was shown in a playable demo version, so we placed a joystick in front of the screen to give the show's visitors a chance to play. In the beginning, people just stood in front of it and stared at the info screen. As the halls were occupied by more and more visitors, more people tried to play the game. The endmonster died thousand deaths, and so did the people at nearby booths, since they repeatedly got to hear the mighty guitar sound which accompanies it. There were also some odd quatations concerning Metal Dust: "Look, Amiga-trash!", "Hey, I own that game!", "There, that's Nemesis!", "Is the music played with that CD-ROM drive?", "A C64 with 1 MB memory, that's a joke, isn't it?"

Later we also ran the new 4-player-game *BombMania*. This game is shipped with a small user port cartridge which supplies two additional joystick ports. It was great: Many kids played the game and really enjoyed it—that they were playing on a 15 year old computer (which even has not to be tuned up for that game) didn't matter—only the fun playing the game counted, and fun they really had!

We also occassionally showed the new SuperCPU-demo by DMAgic, in which a picture of a SuperCPU rotates and an awesome music plays. Again people stopped to gaze at the screen, almost hypnotised by the rotating SuperCPU animation.

On Saturday Wolfgang Grimm and Markus Kanet arrived with their "Geos MegaPatch 3.0". Even those among us who normally don't use GEOS were astonished about the new system and the Win95/NT-like desktop. The show's visitors liked it a lot. Next to the machine we placed a sign: "10 times faster than Windows, and 10 times cheaper too!". But it was not allowed to stay long—the organizers of the show told us to remove it, since comparitive advertisement was prohibited. Obviously Geos MP 3.0 was really regarded as a rival against Windows! We said thanks for the compliment and replaced the word "Windows" with "PC operating systems"...

Many people asked us about all the C64 hardware we had there and listened to our explanations. Some of them then said: "Surely a nice handicraft work". And while some C64 owners didn't feel good with the pricing, many found 400 DM for a SuperCPU not at all too expensive. Compared to what a someone might spend to upgrade from 90MHz to 166MHz (not much when expressed in percent!) a SuperCPU isn't expensive when considering that it speeds up the machine by 2000%!

Many of our faithful readers also visited our stand to meet the makers of the GO64! magazine personally. Manuel "Sputnick" Nickschas was also there. Manuel is working on a new Turbo-like assembler (including machine language monitor) for the SuperCPU.

It was interesting to watch people who remembered the old times—it was almost possible to read their mind: One would approach our stand, suddenly spot the blue power-on screen of a C64, slow down, then stop walking. Without coming closer he watches the screens, sees happy and fascinated people around the Commodore machines... he thinks it all over, fights against himself, then suddenly turn around and hurry away. This is not his world—not long time ago he bought a supermodern Personal Computer with Office'97 and he feels good with it... or not?

In the hall there was a sign hanging down from the ceiling: "Fascination Computer". Surely a lot of visitors experienced this fascination at our booth. It was really great to see all these happy eyes... a C64 booth in the year 1997—who would ever had considered this possible? It's a little miracle, like GO64! itself, and clear proof of the fact that the C64 community is strong and holds together.

And if everythings works well, maybe in one year we will be present at the show again, or perhaps even earlier at another one!

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GEOS Moves Forward

Wheels and GEOS MegaPatch 3.0

by Doug cotton

In Commodore World Issue 21, Paul Sullivan's *Graphic Interpretation* column was titled, "Give GEOS What It Really Wants: RAM Expansion". And if you didn't heed Paul's advice then, you'll may be doing so soon—especially if you plan to use either of the expanded GEOS Kernal patches due out in the next few weeks.

GEOS v2.0 has done reasonably well in terms of usability for those who wanted a point and click interface on their Commodore. But there have always been some weak points as well. In recent years, many of the inherent weaknesses of GEOS have been overcome, not so much by updates to the operating system itself, but by hardware upgrades that helped to centralize files, speed disk access, and even speed up the computer itself. Many of these hardware additions came with strings attached: you generally had to apply a minor Kernal patch or use a version of the GEOS CONFIGURE file specially made to support the particular piece of hardware you were adding. All of these little patches and variations of system files have led to something bordering on chaos, or at the least an immense logistical puzzle for the end user who wanted to use combinations of hardware in ways that were not considered to be in the 'normal scheme of things' by the developers.

With the release of two new products, *Wheels* (by Click Here Software) and *GEOS MegaPatch 3.0* (by Megacom Soft), the days of special patches and custom CONFIGURE files will hopefully be over. In addition to integrating the wide variety of new hardware items that have materialized for GEOS over the past few years, these 'upgrades' also provide a variety of new features. But before we get into specifics, be forewarned: as the opening paragraph of this article hinted, both of these new systems absolutely REQUIRE that you have some compatible form of RAM expansion.

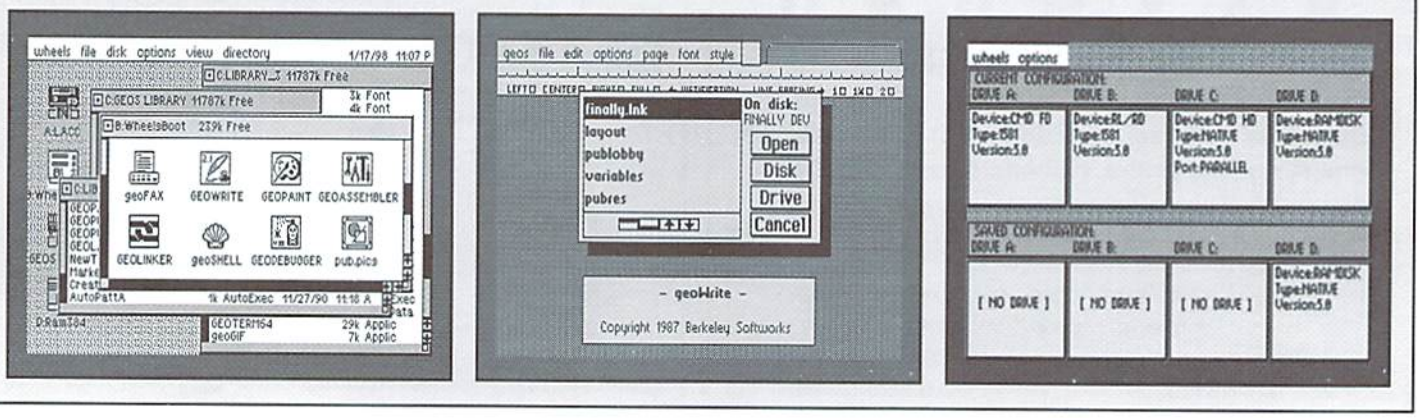
Wheels

The upgrade now officially called *Wheels* has been rumored for quite some time (as *Project G*). The 64 version will reportedly release in a few weeks for a price of $36.00, with the 128 version to follow approximately three months later. To be able to use the Wheels upgrade, you must have an original GEOS 2.0 system disk and RAM expansion.

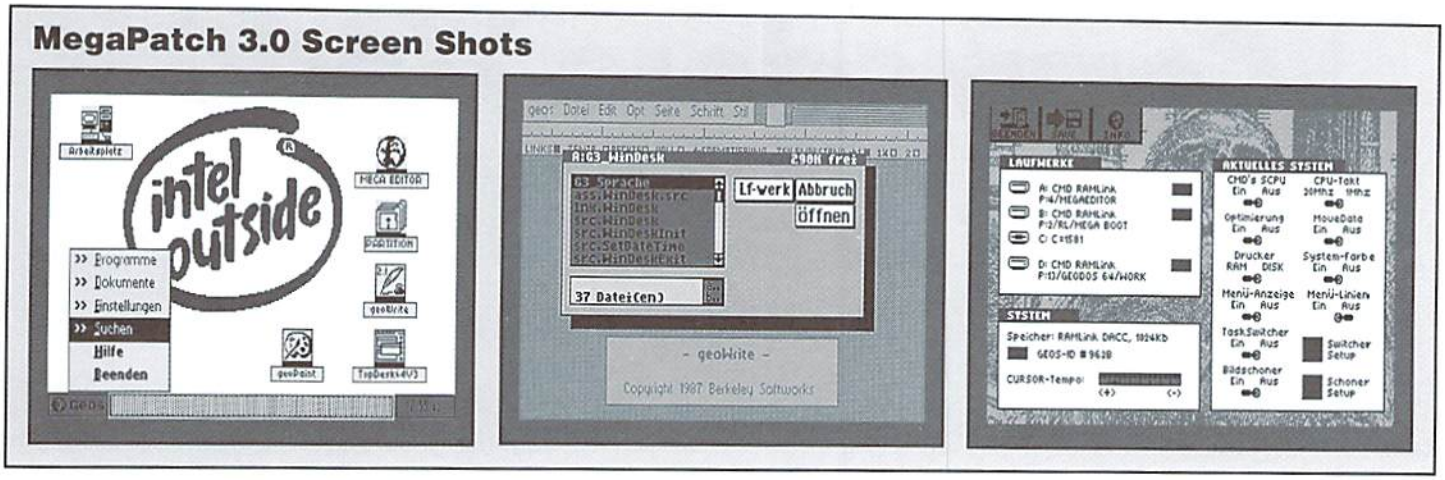
The roots of the Wheels upgrade go back several years, to the inception of better disk driver routines that Click Here Software's proprieter and chief programmer Maurice Randall had devised. Public knowledge of some of these drivers came when Maurice released new drivers for CMD's gateWay 128 to replace the buggy Native partition drivers included with that system. As Maurice found himself more and more involved with various Kernal patches and driver rewrites—both for CMD and for his own programs—the idea of a major rewrite of the GEOS Kernal and assosciated GEOS utilities and applications took hold.

Wheels replaces the GEOS CONFIGURE with the *toolbox*, where you can set default parameters for RAM expansion and drives. Wheels will attempt to use the saved toolbox defaults during boot-up, but will still boot from other configurations if your equipment configuration has changed.

Wheels Screen Shots



MegaPatch 3.0 Screen Shots



RAM support includes Commodore or CMD 17xx-series REUs (any size), SSI SuperClone, GEORAM, BBGRAM, RAMLink, RAMDrive or SuperCPU SuperRAM. RAM disks can be any size up to 16 Megabytes, and may consist of up to 8 seperate RAM partitions within a RAM device.

Drive support includes 1541, 1571, 1581, CMD FD and CMD HD hard drives. Partition support for CMD devices is built into the system, and allows using 1581 and Native partitions on all. Commodore 1581 drive users may use either the standard 1581 mode, or may use disks specially formatted by the system in a CMD Native format referred to as an FD-1000 format (800K Native). This latter option lets 1581 users take advantage of the built-in CMD Native partition subdirectory support which is otherwise limited to actual CMD devices.

The 'dashboard' replaces the GEOS deskTop, and provides a multi-window environment. The background pattern and the colors for the screen and objects are user-definable. On the screen you'll see icons for up to four devices (these may be relocated anywhere on the screen), a default printer, the ash tray (which replaces the trash can) and up to 16 directory windows.

Each dashboard window shows the contents of a disk, or the contents of a partition or subdirectory when using CMD Native formatted devices. Up to 2040 files can be displayed per window, and the function keys can be used to define pattern matching to limit a window's display to specific types of files, or files within a given date range.

Each window may be independantly resized and moved, and may also be set to display files in either Icon or Text mode. Other window properties include a proportional slider control for scrolling through window contents, and a fuel gauge to indicate how full the disk or partition is.

File selection may still be done as in standard GEOS, and you can also perform click & drag selection of single or multiple files (scrolling is automatic in this mode if you drag to the edges of the window in a scrollable direction. Copying files between any combination of disks, partitions and subdirectories is possible by dragging files between windows associated with the source and target directories.

Wheels also incorporates a new file selector box providing access to up to 255 files of the type specified by the application. The file selector also provides options for accessing files in different partitions or subdirectories on CMD devices.

GEOS MegaPatch 3.0

This upgrade comes from Germany's Megacom Soft, and is being written by programmers Markus Kanet (author of GeoDOS) and Wolfgang Grimm (author of TopDesk). MegaPatch 3.0, or MP3 for short, requires RAM expansion and a previous version of GEOS. Both 64 and 128 version are being developed, and Megacom indicates that the product will be ready for shipping in sometime in spring of 1998 for DM60 (about US$40). We have not yet heard whether the release date and price applies to the 64 or 128 version, or both; or whether the English language version will be ready at the announced time, or if this only applies to the German language version.

The main user interface, called Windesk, departs radically from the standard GEOS deskTop in many respects, by employing 'look and feel' elements of Windows '95. Megacom has indicated that Windesk will allow file maintainence using a windowing structure, however, none of their current screen shots have shown these windows. We assume that this part of the system must still be under development. Windesk features a user-definable backdrop screen and a single GEOS menu that is similar to the START menu in Windows '95.

As with Wheels, the GEOS CONFIGURE program has been replaced. In MP3 the replacemt is called the Mega-Editor, which offers configuration and setup options for the TaskSwitcher, drives, partitions and SuperCPU.

Other improvements over standard GEOS indicate that a new file selector will be available, providing access to up to 255 sorted files. Files within the selector can be selected by double-clicking the filename, and can also be chosen using keyboard controls. Options are also provided for working with subdirectories.

Other features mentioned for the release are a screen saver, task switcher (up to nine applications provided sufficient RAM is available), screen capture function, and print spooling.

Conclusion?

The announcements of these two expansion products for GEOS gives GUI users something to really look forward to over the coming months, but until both systems have released and can be tested, any conclusion about either would be premature.

Both systems appear very similar in basic abilities, but provide user interfaces which differ widely in philosophy. MP3 offers more anciliary functions that are wrapped up in a user interface that may seem foreign to many current GEOS users. Wheels, on the other hand, appears to be a more modest offering, its user interface looks like a more natural evolution of the traditional GEOS. The success or failure of either product, however, will probably hinge more on the implementation of its abilities than on the features it boasts.

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Just For Starters

by Jason Compton

LOOKING FOR TROUBLE IN ALL THE RIGHT PLACES

I've always hated the troubleshooting sections of computer manuals. More often than not, trying to reference them for useful information is a complete waste of time: once you get beyond "Try making sure your device is plugged in," they have nothing of value to offer. And of course in this day and age, qualified help for your 64 isn't always right around the corner.

There are a few common problems that you might be having, or may run into in the future, and your manuals might not give you the best answer. Let's see what I can do to help out.

General Tips

The first thing to remember is that you should try not to panic. For one thing, Commodore equipment is on the whole reliable. Also, it's a whole lot more difficult to work through your problems when you get agitated—that's advice I sometimes have difficulty following, but I know it's true all the same. We can't solve everything in the comfort of your own home—there are definitely some problems you should send away for service if you're not an expert—but others are fairly easy to deal with.

Computer Troubles

Sometimes bad things happen to good computers. Keep in mind that the average age of a Commodore computer is something around the decade mark, so the occasional problem isn't to be completely unexpected.

No Display/No Startup

The first thing you should make sure of when you get a black screen on startup is to verify that it is the computer itself and not the cabling or the monitor or TV you're using. You can tighten or replace cables and try using a different TV or monitor: particularly if you have the "3-cable" job used on the 1702 monitor, you can easily use a variety of monitors and TVs that take composite input by using the Luma plug. The resulting display will be black and white but it will at least give you an answer.

But let's assume that it's not the display device or cabling to blame. What you should try next is to see if the computer is functioning at all. The best way to do this (aside from checking the power light) is to try to get the computer to access the disk drive. On a 128, which will try this automatically, your answer is easy enough to get. On a 64, try issuing a simple disk drive command by typing blindly. I'd suggest loading a directory with load"$",8

If you get disk drive action, you know your computer is still functional. At this point, we've moved beyond the simple home remedy—take this information and pass it along to a qualified service individual.

Believe it or not, it might actually be better news if the computer is totally unresponsive. Why's that? Because instead of having to send away for repair, it might be a really simple problem: a fuse. Your computer has a fuse in it, either on the motherboard (64 models) or in the power supply (128s). And it can and does happen that this fuse will blow. Replacing it is child's play, and it's a standard, regular hardware store fuse. While you should be very careful when opening your computer or the fuse hole on the power supply (please, please unplug everything before you work on it!), this is a simple cure.

If it's not just the fuse, again, it's time to scan the magazine for a service company.

Corrupted Displays

If you're finding that your video is corrupted: that you get a garbage display when you turn on the computer and the computer may or may not work otherwise, first try a simple test

of turning the machine off, giving it a short rest, and powering up again.

If this doesn't fix the problem or it shows up with annoying frequency, you may have a power supply problem. The original C64 power supply in particular has often been blamed for a number of difficulties, including damaging the computer itself. If at all possible, try swapping power supplies, or invest in a heavy-duty unit. Also, try keeping the power supply unplugged from the wall while off. It may be that the damage caused cannot be reversed by changing the power source, but if you replace your machine you will at least be better equipped the next time.

Disk Drive Bothers

Floppy drives are workhorses—we ask them to be constantly reliable and dependable, we yell at them for being slow and throw all sorts of solutions at them to make them faster. And sometimes they're less than perfect.

Splat Files

If an error or power loss occurs while the 64 is trying to save a file, often a "splat" file results. These are easily recognizable: in directory listings, they are zero block files and are tagged with an asterisk. The question is, what to do with them?

They can not (and should not) be erased by normal means, like the scratch command. Instead, you have to do a validate (V) command. Hopefully, all will go well and you'll find an OK disk results. However, if there are other errors on the disk, the validate command may fail. My advice in this case is to do a file-by-file backup of the disk to another disk and to reformat the original. You'll be trouble-free after that.

1571 Headaches

Some 1571s (including those in 128Ds) have some trouble properly aligning to new disks that get inserted. If you've been putting in perfectly good disks but are getting drive not ready errors, it's possible you're having this problem.

CMD and possibly other service companies can fix this mechanical defect for you. The remedy, which can get annoying (and which doesn't seem to work in CP/M mode) is to:

1. Hold the disk deep in the drive while closing the door.

2. Perform an initialize drive command whenever you insert a new disk.

3. If you can tell the drive is having trouble reading the disk, give the disk a "thump" with your finger. It really works.

Unreliable Drives

If you are having trouble with your disk drives—getting corrupted loading and saving, for example—and you have a long drive chain, that may be to blame. Because of the structure of the serial drive bus, the signal can get diminished as it travels across several feet and multiple devices in the chain. As this happens, your data is not transmitted as cleanly and it may lead to errors.

If a drive is behaving badly, try unplugging the rest of your drives and hook it directly to your machine. If that solves the problem, you can be reasonably sure it's the length of the chain causing the problem. One way to help remedy the problem is to make sure all of the devices in the chain are on. Particularly for 128 systems, this can make a difference.

A Word About Heat

All electronics equipment is suceptible to some degree to overheating. Some ways to avoid this are:

- Avoid stacking things on top of your floppy drives. Old 1541s can throw off a lot of heat and years of use with something on top of them (like another floppy drive) can be bad for their health.

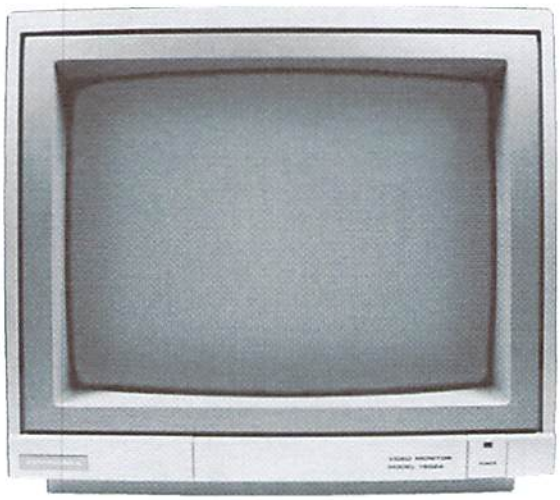
- Try to avoid putting any equipment in an enclosed space. If air can flow above and behind the device, it's a much better environment.

- Get a mini-fan and set it to blow across your equipment. (I have known sysops, who by necessity have a lot of equipment running 24 hours a day, who have done this and found it reduced random crashes.)

One common impact of heat is to "work loose" the chips in your computer. This can result in unreliable operation. If you suspect this may have affected your computer, a good cure is to push down on all the socketed chips in your computer. If you start hearing satisfying "crunch" noises, it's a good indication that they had worked themselves a bit loose.

Keyboard Trouble

Unreliable keyboard trouble can be something very straightforward to cure, or it can be a symptom of a very serious problem.



One of the simple problems can be dirt. The area between your keys is suceptible to buildups of dirt, dust, hair, crumbs, nail clippings, etc. And over a number of years, that buildup can get downright formidable. I had a 64 which I used for nearly 6 years, and it wasn't until I started typing on a different 64 just how much trouble I was having with certain keys at home. When I returned home to try to clean out the keys, I was horrified at what I found.

A good tool to use for cleaning out those slats is a good stiff index or business card.

Another in the "simple" category is to make sure that you don't have a malfunctioning or jammed device plugged in to your machine, particularly in Joystick Port 1. This port in particular generates keyboard-like response when manipulated, and if it's stuck it can interfere with your typing.

Jason Compton is a freelance writer and Editor of Amiga Report, the online news resource for Commodore Amiga users. Jason can be contacted via Email at jason@cmdweb.com.

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Graphic Interpretation

by Bruce Thomas

LASER MAGIC

One of the greatest 'features' of GEOS is the open nature of the system; by this I mean all of the programming information available to users. While every user is not a programmer, every user has benefitted from the many great programs that have been created by users who are programmers. We have also been very lucky that a lot of smart and adventurous people have been GEOS users.

Among these pioneers of GEOS, a number stand out for their contributions to using GEOS with a Laser Printer. These include Randy Winchester (whose series of articles in GeoWorld helped me start using a Laser for output in the fall of 1988), Dale Sidebottom (who has been a dedicated GEOS Laser user for many years; he has also recently made some HUGE new laser developments), Skip Goetzinger (whose Laser Direct service provided a means for GEOS users to have inexpensive access to Laser output and also published numerous Laser Printer Publishing kits to help do things right), David Ferguson of Quincy Softworks and Dweezil fame (who wrote a comprehensive GeoPublish Laser Printing Compendium), Jeanine Cutler (who bought an HP Laser and wrote a couple of articles for GeoWorld on how to use it) and Jim Collette (a brilliant young

programmer who wrote many fine GEOS programs).

We are going to explore the use of one of Jim's programs. 'PS Processor' is available from Creative Micro Designs, Inc. on the Collette Utilities disk. This terrific program allows easy manipulation of PostScript files and enables a variety of print options. The program uses a simple script file (written in geoWrite) that tells it where to place each page of a geoPublish document for custom Laser printing.

Compatibility

The 'PS Processor' dox, and Jeanine Cutler's useful examples which come with the program, incorrectly state compatibility problems. 'PS Processor' operates properly no matter which version of geoPublish or geoPubLaser you have. You must, however, have the properly matched versions of these programs, as that is where the incompatibility occurs.

If your geoPublish is dated 10/8/87 you must use geoPubLaser dated 3/10/88. For the two-disk geoPublish dated 10/4/88 you must use geoPubLaser dated 10/25/86. Using mismatched versions of these programs will result in improperly formatted output.

Once you have the correct geoPubLaser, a copy of it must be patched with 'PS.Patch(disk)'. This patch program is also on the Utilities disk and enables 'PubLaser to write the PostScript file to disk so 'PS Processor' can do its magic.

Which Page do You Want

In this article I will talk about three types of pages. Logical Page refers to a page as viewed in geoPublish and as written to disk with a patched geoPubLaser. Virtual Page refers to the page that is assembled in the memory of the laser printer prior to printing. Physical Page refers to the page that comes out of the laser with your document on it.

While normal geoPublish output prints one logical page to each physical page, 'PS Processor' takes advantage of the PostScript language to allow multiple logical pages to appear on each physical page.

'PS Processor' also makes it possible to print in landscape mode. Normally, output goes to an 8.5" x 11" letter size physical page with the 8.5" side along the top - this is called portrait mode. Landscape mode prints to the same 8.5" x 11" physical page but the 11" side is along the top (virtually rotating the output 90 degrees). In addition, output can now be formatted to fill an 8.5" x 14" legal size physical page in both portrait and landscape modes.

To make these printing options all possible, 'PS Processor' makes use of a virtual page in the Laser Printer. Depending on the mode selected, the default virtual page allows different sections of the logical page to appear in different locations on the physical page. Luckily, we can move the location of the logical page, or we can move the virtual page origin, by including coordinate offset values in our script file. Are you thoroughly confused yet?

The Coordinate Grid

As mentioned, the chosen mode determines the location the logical page will print to. This is best understood by placing X and Y coordinates on a graph Figure 1 shows the default origins and the relationship of the logical page orientation to each physical page mode.

In portrait mode the default origin is located in the lower left corner of the page. This allows the entire logical page to appear on the letter or legal size physical page.

In landscape mode the default origin places the top 8.5" of the logical page on the physical page with 2.5" of space along the right edge (this is true on both letter or legal size paper). If you wish to place your logical page at the left landscape edge of a legal size physical page you must use an offset of -240 to shift the logical page 3" left.

Where did the -240 come from? The coordinate system is based on the dot resolution of GEOS, not the Laser. The horizontal resolution is 80 dots per inch (dpi) and the vertical resolution is 72 dpi. Three inches multiplied by 80 dpi equals 240 dots for an offset. The offset values are in relationship to the origin with positive values moving the logical page right (X) or up (Y) and negative values moving the logical page left (-X) or down (-Y).

The Project

I recently returned to school to drastically change my career path and wanted some cards I could hand out to people I met in my future field of work. Rather than go to a local business, I put GEOS to work and made my own.

For my business cards I bought a package of perforated sheets with 10 cards on each sheet (these are commonly available at many office supply stores). The cards are standard size (3.5" x 2") and in geoPublish you can easily make a layout to match them. With

Figure 1: Postscript position information for different paper sizes

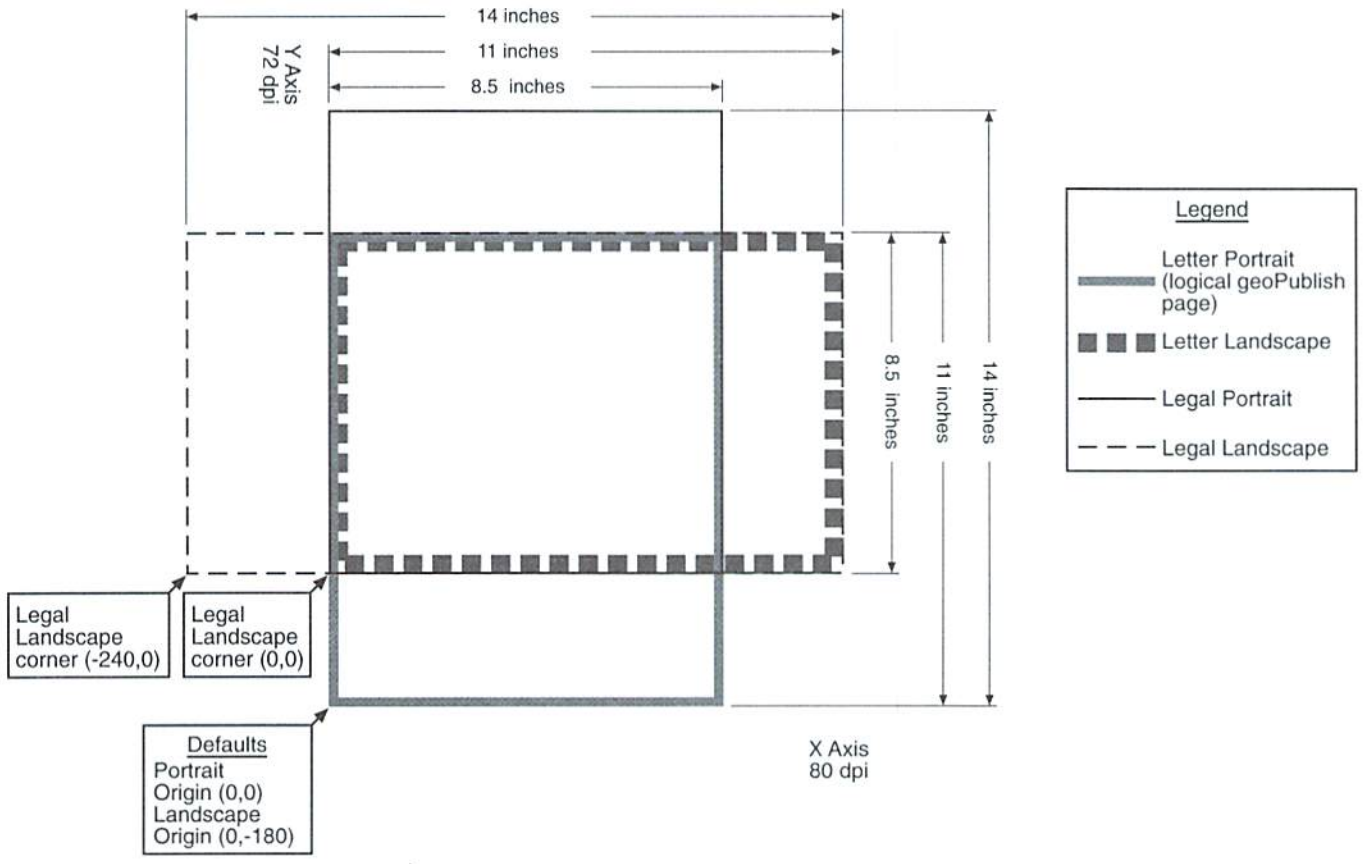
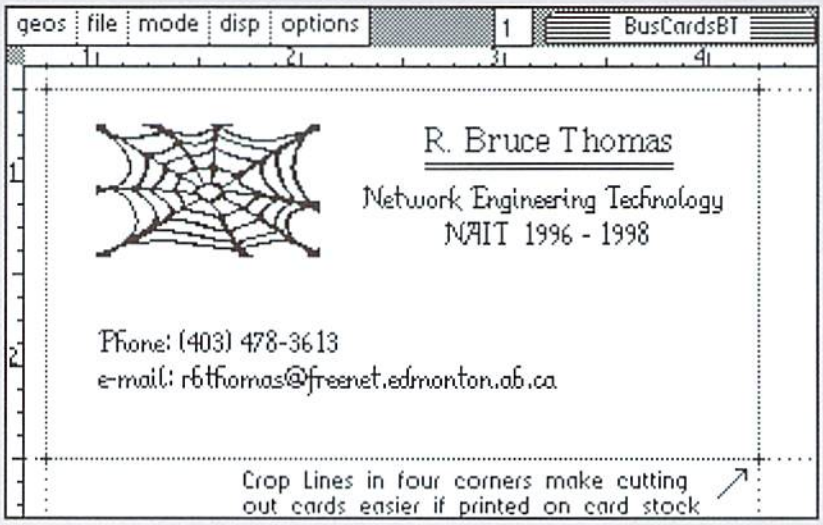


Figure 2: Laying out a business card in geoPublish



'PS Processor' we only need to create one card in the geoPublish document and then add it to the virtual page multiple times via the commands in our script file.

Putting It All Into Practice

To better understand the whole 'PS Processor' process we will look at my business cards. More understanding can be realized by printing Jeanine's examples.

Since 'PS Processor' allows us to place multiple logical pages, or copies of the same logical page, onto each virtual page we only need to create one business card in geoPublish. The card sheets I bought had 1/2" borders on the top and bottom and 3/4" borders on each side. The rulers in geoPublish made it easy to create my card in the top left position by setting horizontal guidelines at 1/2" and 2-1/2" and vertical guidelines at 3/4" and 4-1/4" (Figure 2).

I used a geoWrite file for my personal information. After importing this file (which was laid out entirely with 'LW' fonts for best quality laser output) I added the graphics and was ready to print. If you are going to take your printout to a copy shop to be copied onto card stock use the same layout but add crop lines in the corners to mark where to cut the cards (Figure 2).

And, Action!

Just like a Hollywood movie, 'PS Processor' needs a script to make things happen. Scripts are a collection of commands contained in a geoWrite file that instruct 'PS Processor' what to do with the logical pages in the disk file created by the patched geoPubLaser.

To print the business card in ten locations on the physical page the script must use a series of 'include' commands with offset values. Here is the script I used:

```
parallel
numcopies 10
include 1 0 0
include 1 0 -144
include 1 0 -288
include 1 0 -432
include 1 0 -576
include 1 280 0
include 1 280 -144
include 1 280 -288
include 1 280 -432
include 1 280 -576
print last
```

The first line tells 'PS Processor' that a laser is connected to the 64 via a geoCable parallel connection. The second line sets the number of physical pages I want to print. By printing 10 pages I will get 100 cards. The third line adds logical page 1 to the laser's virtual page in the default location. The next four lines add logical page 1 to the virtual page at 2 inch intervals down the page (2" x 72 dpi = 144).

Since our cards are 3.5" wide we must shift the logical page 3.5" to the right. The next line (include 1 280 0) adds logical page 1 to the top of the virtual page but shifted right 3.5" (3.5 x 80 dpi = 280). The next four lines add the logical page to the right side of the virtual page at the same 2" intervals.

Finally, the 'print' command is sent to the laser indicating the virtual page is complete and ready to be output on a physical page. If more virtual pages were to be created another series of 'include' commands would start on the next line. Since we are done, we add the 'last' parameter to our 'print' command to reset the laser for another print job. That is the end of our script and 100 business cards will pop out of the laser.

Other 'PS Processor' commands allow the use of serial interfaces or outputting a file to disk, enabling landscape mode and changing the virtual page origin.

A Limitation

One thing that the 'PS Processor' can't make up for is the physical print area of various lasers. When I first printed off Jeanine's examples I did so on an Apple Laserwriter. This laser has a small print area when using legal size paper (6-3/4" x 13" compared to 8" x 13-1/2" on a Canon laser). I didn't realize this at first and thought there was a problem as the text was cut off around the edges. Knowing the print area of the laser that will be used for output will allow you to get the most use out of this fantastic GEOS program and soon you too will be performing laser magic not otherwise possible.

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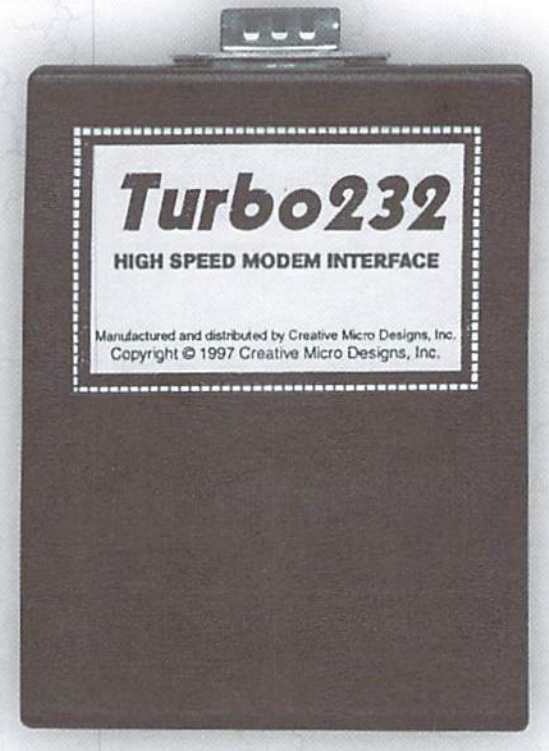

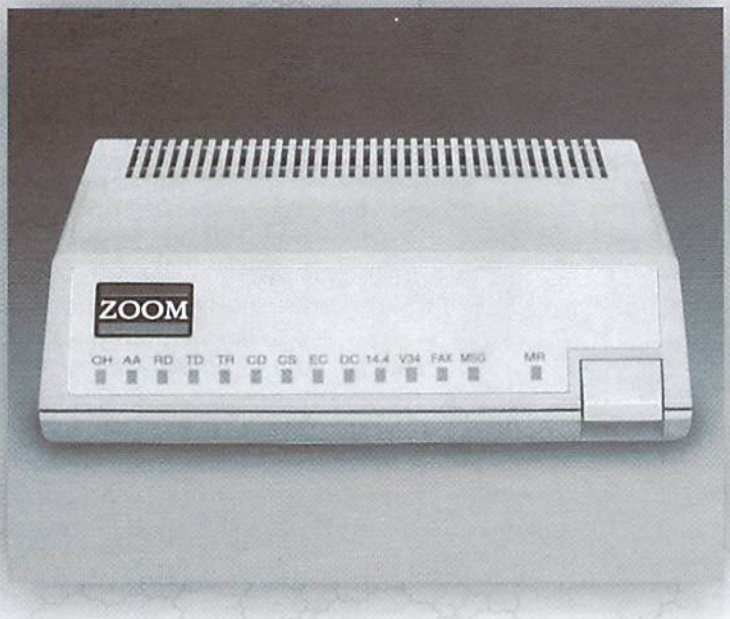

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DemoMania

by Sherry Freedline

THE DEMO WORLD WAKES UP

After writing my last column, I began to dread writing this one due to the lack of activity within the NTSC demo scene. Fortunately, a lot of activity began last July. Due to space restrictions, we'll cover the releases that came out through September of 1997.

During that time, there were a grand total of nine releases, plus a Special Issue of Driven honoring our sadly lost friend of the demo scene; Waveform (Driven #23). In addition, the long awaited NTSC Co-op Demo 1997 was finally released! Was it worth the wait? Well, read on and see for yourself.

Activity in the scene came back to life with two new demos from RPG; *Eclipse* and *Graphical Ignorens*. Shortly thereafter we welcomed back Venom with their new demo, *Grave Diggers*. Stephen Judd also added to all the activity with his release of *Cool World*, featuring a nice vector routine. Again, due to space constraints, I'll have to cover some of the releases in an upcoming column.

Driven's Tribute to Waveform

Everyone, even those only remotely active within the demo scene, can't help but feel the almost overwhelming loss of one of the scene's most energetic participants: John Kaiser, also known as Waveform.

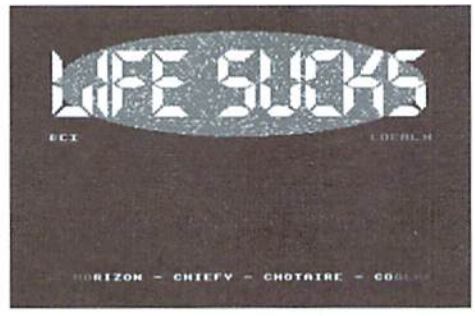
Out of respect, honor and the driving desire to create an eternal tribute to our special friend, Driven released a special issue as a "Tribute to Waveform". For those of you that never had the pleasure of John's acquaintance, this issue will give you some insight as to why John is missed and why he was so very special to his friends as well as the Commodore Demo Scene.

This special edition of Driven consists solely of articles about Waveform submitted by his friends and associates. This alone refreshes my passion for the Commodore Demo Scene by illustrating this point: it's a group of special people bound together by their unique talents and their love of a common interest—the Commodore computer.

If you'd like to know more about John, his contributions to the demo scene and why he's left the scene with such an incredible loss, download this special edition of Driven today. Thanks to everyone involved for creating an eternal tribute to a person I'm honored to have been able to call my friend.

Life Sucks by BCI

Life Sucks is a short release created by a another new demo group, BCI-Bad Coders International. BCI consists of Local-H (coder), Phred (music), Sketch (coder), and UDD (artist). BCI's demo consists of a nifty looking "Life Sucks" logo complete with music and the obligatory greetings



scroller. This demo isn't extraordinary on it's own; but, when you think about the work involved in producing something like this, it's amazing. One of the best things I love about the demo scene is the fact that "newbies" seem to be welcomed more readily now than they have been in the past. This is not the first demo released by some of BCI's members; however, it is a one-pager limited to the normal logo, music, and scroller. Life Sucks simply looks great—clean and polished. Next time perhaps BCI will provide us with two pages showing all that they've learned since *Life Sucks* (Just wait until you see Local-H's Co-op Contribution!). Keep up the good work BCI and thanks for giving us a nice looking demo to add to our collections (and for the greet)!

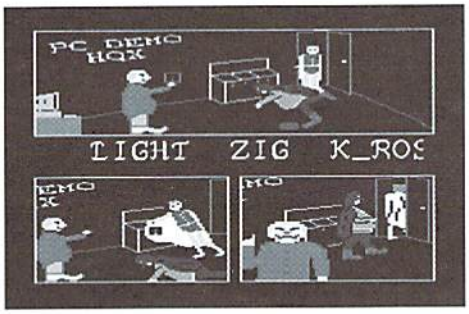
The Misadventures of The Fatman - Part 2 by The Fatman and Coolhand

I think I may have missed reviewing *The Misadventures of The Fatman - Part 1*. If you didn't know of its existence, this is one demo (make that 2) you'll want to download. The Fatman, known simply as TFM to some, is also relatively new to the scene. In his short time with the scene he's definitely made his name known to one and all with his comic book styled demo series, produced and created by both TFM and Coolhand. Coolhand is no stranger to the scene either. In fact, Coolhand has become a legend in the scene by hosting the weekly NTSC Demo Conferences on the IRC, editing the infamous Driven demo mag, and other miscellaneous activities. Coolhand has now added another credit to his name by writing and providing the panel layout for *The Misadventures of The Fatman*. TFM puts the pieces together providing the demo scene with a laugh or two.

Each release has focused on circumstances familiar to those involved in today's scene. And, if you're a regular within the IRC world, you're

sure to get a laugh or two from the demos. This Batman spoof features the antics of Fatman (who, of course, is always hungry) and Bobin (who is always trying to pry Fatman away from his food to solve the current dilemma).

While the demo's graphics have a bit of an amateur look to them, the content easily leads one's attention away from this fact. I think this quality lends a cozy feeling to the demo and



makes an all-important point: Release those demos... we all start somewhere! I am REALLY looking forward to viewing more episodes of *The Misadventures of The Fatman.* Perhaps someday Fatman and Bobin will meet up with "Zigwoman"?

To TFM and Coolhand I'd like to say, "You're a hit! Thanks for your on-going contributions to the scene!!"

Icon by Saga

In addition to announcing the news of all these releases, I also get to announce the fact we have another new group amongst us! Saga consists of three members: GHB - Artist and Writer, Shogun - PC Converter??? and Touch-up, and Dr. Moreau - Coder and Designer.

Their first release, *Icon,* introduces each member and tells the tale we've heard so often before. Each of them thought the C-64 was without a following until they found their way to the internet and the IRC's #c64 channel. Before long they discovered how active we still are and were inspired to dust off their Commodores and once again participate! I love it!

Saga is more or less a demo announcing their new presence in the scene. And what a demo it is. It's only a one-pager; but, wow! The graphics are extremely professional! The demo is also equipped with music and a scroller relating their journey to today's NTSC Scene. With an intro such as *Icon,* one can't help anticipating their next release. Welcome to the Scene, Saga!

NTSC Demo Co-op 1997

The Co-op idea was first introduced during the last few months of 1996. At the time, everyone was really excited. Unfortunately, the enthusiasm for the production died down, and real life slowed its long awaited release. At times, I have to admit, I didn't think we'd ever see a finished product. The responsibility for gathering the various pages and tying them all together was handed from one person to the next until finally it fell into the hands of dW, a patient and enthusiastic member of Style.

Being the demo loving impatient person that I am, I'd log on to the IRC week after week after week begging for information regarding the Co-op. Finally, on 10/3/97, the first ever NTSC Demo Co-op was released to the public! I can't tell you how happy I am to see the project completed!! Thanks to everyone involved for all their hard work and persistence!!!

Way back when the Co-op idea first began, individuals wishing to participate threw their names and their abilities into a virtual hat. The names were then further divided into three more hats; coders, artists, and musicians. From here one name was pulled from each hat to form five teams. Each team was then responsible for creating a demo page. The creations were submitted and bundled into what you now know as the first official NTSC Demo Co-op.

The Co-op consists of five pages all accessed through an astonishing 3-D menu system created by none other than dW/Style, Dokken/Electron, Light, and The Fatman. The menu consists of a logo created by one of the scene's well-known comedians; Dokken, with music contributed by Light and the font supplied by The Fatman.

The excellent coding routine tying all the parts together was done by dW. The screen consists of the NTSC Co-op Logo at the top, followed by the list page titles floating in an animated, starry background. Pages are selected by scrolling down the screen, highlighting a title and pressing return. The menu is professional in appearance and lends to the excitement of the demo.

The credits dedicate the Co-op to the memory of Waveform. The Co-op keeps within Waveform's "...personal mission to have as much fun as possible in the NTSC scene and... to put as much life and energy into it [the scene] as possible."

The demo consists of five pages: *Pagino Del Grupo 6, Waveform Tribute '97, We Are Not Your Pal, Technobabble,* and *Sequestered.* The credits for each demo can be found in a side bar elsewhere in this article along with some pictures to whet your appetite

The humor of Dokken begins the demo with *Pagino Del Grupo 6.* The highlight of this page is a David Letterman style top ten countdown list of the 10 most repeated phrases with demo greets. Bet you can't guess the number one phrase!

The NTSC Demo Co-op 1997 Credits

Pagino Del Grupo 6
Code: Dokken/Electron
Art: Phantom/FOE
Music: Phred

Waveform Tribute Œ97
Code: The Fatman
Art: The Fatman
Music: Zyron/F4CG

We Are Not Your Pal
Code: Firestalker/FTA
Art: Burning Horizon/FTA
Sprites: Local-H/BCI
Music: Necrophic/CCS

Technobabble
Code: Fungus/CCS
Art: Carcass/CCS
Music: Odie/Cosine

Sequestered
Code: Macbeth/PSW
Art: Necrophobic/CCS
Music: Pinball Wizard/CCS

The Menu Page
Code: dW/Style
Logo: Dokken/Electron
Music: Light
Font: The Fatman

Waveform Tribute '97 follows featuring a colorful page of waveforms dedicated to our dearly missed scener. I loved this page because of its bright and colorful presentation and upbeat style.

We Are Not Your Pal features a patriotic logo sure to capture your attention. It's a nice looking page adding that little extra flare to this long awaited release.

Next up is *Technobabble.* The highlight of this page is a scroll of conversation that goes on and on featuring a guest spot from our infamous scene "manager", Coolhand.

Last, but certainly not least, is *Sequestered,* which features a really "gotta see it" effect with a 3-D wrap-around graphic. The remainder of the page features the designs of someone's shirt.

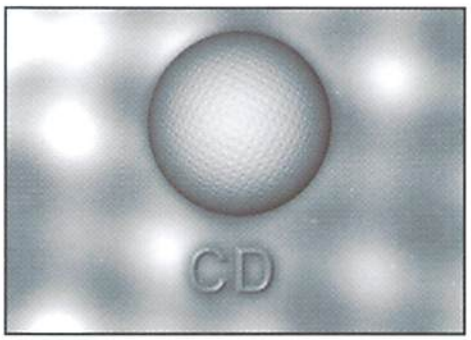
I deliberately left the descriptions somewhat brief. The NTSC Demo Co-op '97 has already earned a place on my "soon-to-be classic" demo disk. I hope you'll enjoy it as much as I have and as much as everyone involved had putting it together. These folks deserve a handful of kudos for persisting and seeing this one-of-a-kind project through to completion. Thank you everyone!

Sherry Freedline is a freelance writer. Visit Sherry's homepage on the Internet at http://www.lm.com/~qt, or drop her Email at: sherry@cmdweb.com.

Carrier Detect

By Gaelyne R. Gasson

SLIP, PPP, CLIENTS, SERVERS... OH MY!



In the near future, we'll be finding our way to the Emerald City and find that we're not in Kansas any more when it comes to Internet access. We'll have new programs and a new lexicon of words and phrases to go with them. Have you ever wondered just what SLIP and PPP mean, and what using them will be like? Let's take a look and see how we'll be using the Internet in the not-too-distant future.

SLIP (Serial Line Internet Protocol) and *PPP (Point-to-Point Protocol)* are used for Internet connections, and when we use them, our computer becomes part of the Internet as a whole. From the user point of view, once online they each function essentially the same way, with slight variations on the initial set-up. You can only use one or the other, not both. So far, for the Commodore, the only protocol that's been developed has been SLIP. There's Daniel Dallmann's Slip Demo (http://rpool1.rus.uni-stuttgart.de/~etk10217/C-64.html), and eventually we'll have other programs to use. Developers at *Arkanix Labs* (http://www.arkanixlabs.com/menu.html) are working on a program called *NetStack* that will also use SLIP access to the Internet.

SLIP and PPP are two different types of *protocols*. From a non-computer perspective, when the White House has any function, it's required that they follow very specific protocols so that the event will go smoothly without any embarrassing mishaps, and computer protocols serve a similar purpose. Online, when we transfer files, we use protocols such as Zmodem or Xmodem and it's essential that both computers involved are using the same protocol, as otherwise it won't work - it's the same with SLIP or PPP. Your computer and the one you're accessing both need to use the same type of protocol (SLIP or PPP), else the connection won't function properly.

Currently, we use a term program and dial-in connection to get on the Internet. When we dial the Internet provider using a menu or UNIX shell account, we are prompted for our User name and password, similar to when phoning a Bulletin Board system. SLIP and PPP need to have additional information along with the User name and password, or it may receive this information at the time of connection, depending on what your Internet provider requires. Each and every computer on the Internet has a different address assigned to it that consists of a series of numbers separated by dots, known as the *IP address*. An example IP address is: 123.123.123.123

Some Internet providers assign a static IP address that stays the same whenever you access that particular provider. Other systems allocate a different number each time you connect to it.

Generally, the program that handles dialing and connecting to the Internet also handles the job of sending your name, password, and the IP number (or it receives the IP number from the service to use for that particular session). In Daniel Dallmann's Slip Demo, the user must enter the required information each time they use the program. Other Commodore programs (when they appear) may handle this differently.

Hardware

Will you need to update your hardware to make use a SLIP or PPP connection? This depends on what you already have. If you're serious about using your computer to its fullest potential online, you'll want a high speed modem (14.4k bps or higher) and a UART cartridge interface (such as the Turbo232, SwiftLink or HART cartridge) to "drive" the modem.

A fast (and reasonable sized) storage medium for transferring data, such as an REU (RAM Expansion Unit), RAMLink or hard drive is also important, because your computer will have more demand on

it in terms of software and data. We'll need enough disk space for both the programs we decide to use and for the data that these programs retrieve from the Net. For Commodore users in the ultra-fast lane, you may want to include a SuperCPU in the shopping cart as well.

Dallmann's SLIP Demo requires either a UART cartridge interface or his 9600 user port interface (the schematics can be found on his Web site). Arkanix Labs NetStack program is expected to require an REU and a UART cartridge.

Clients and Servers

Getting there is only part of the fun. Currently, when we use a term program and dial-in connection, once we're online, we use the programs that the Internet provider has made available to us, such as Email programs, Lynx for browsing the Web, newsgroup readers, etc. Some providers offer only the types of utilities they want their customers to use, even though there may be other programs or options available. Once SLIP and PPP become accessible to us, while we'll no longer be at the mercy of our Internet provider for utilities we use online, however, we'll have to rely on Commodore programmers to design and implement programs we can use.

A client is an application (or program) requesting a service from a specific server. One of the first programs we'll need when we have SLIP or PPP access is a program that handles retrieving, displaying and sending Email. The Commodore Email program would be referred to as the "client", and it will connect with and use the mail servers that are on my Internet provider. Each Internet function such as Email, FTP, browsing the Web, telnet, etc has a corresponding server on the Internet provider and requires it's own client. The real fun part is that you can choose what client you want to use in order to access a particular Internet function. We won't have much variety to choose from when this type of access first becomes available, but it's my hope that the information on how to make use of the SLIP or PPP connection is passed on to other programmers who will develop various client software. Hopefully, this will mean we'll have a variety of software to choose from.

One client application that everyone seems to want is a graphical Web browser. In order to have this, first we must have either SLIP or PPP access. I think we'll probably see a text-based Web browser before a graphical one becomes available. This will give the programmer a working (living?) environment in which to refine the web browser. Lynx, the text-based web browser that we use via our shell accounts, is constantly updated to keep up with the latest changes in HTML standards, and I'm sure our own browsers will be no different in this regard. One constant about the Internet - things change, and our programs will need to be able to adapt as well.

As our computers will be dealing with processing the information or files from the Internet, we'll need to have additional disk space for both the programs (or "client applications") we want to use, and for the data it generates or retrieves for us. For example, Email programs and Web browsers will need enough space for both the program and our downloaded Email or Web pages. These programs will probably not be "small", since there's a variety of functions they'll need to include, and both Email and Web pages can take up a fair amount of space. When we have the ability to view graphics from the Web, we'll need to have even more disk space available.

The list below are some of the client applications we'll need once we have SLIP or PPP access:

Client	Purpose/Comments
Email	Correspond with other users on the Internet. It should have the ability to store and use an address book, and should allow sending and receiving files through Email.
Web Browser	Access and view pages on the World Wide Web. Will probably begin as text-only and later offer the ability to view graphics.
FTP	Retrieve files from the Internet.
IRC	Chat with other people around the world in real-time.
Telnet	Connect to other computers on the Internet.
Newsgroup Reader	Download and display messages in Newsgroups. May or may not have the ability to decode files included in newsgroup posts.
Finger	Using a person's Email address, finger lets you read information about that person that they've made available to the public.
Ping	This is used to test whether another computer on the Internet is "live" (online) and the time it takes to send data to that system and have it returned.

Commodore Possibilities

Something we can consider in the realm of possibilities are Commodore-only Internet applications, such as a Chat program that lets one person chat with another in real time. Sure, it's similar to IRC, but allow two Commodore computers to use PETASCII text and Commodore graphics. Another possibility is a BBS transfer system so Commodore BBS sysops can transfer their networked messages easily. As our computers would be connected directly to the Internet, one BBS transfer program could automatically connect to another Commodore computer and transfer messages directly between the two computers.

Stretching the imagination a little further, our Commodore BBS's could be online and accessible to the rest of the world by way of telnet. Many other platform BBS's are available this way already, and there's already been one Commodore BBS connected to the net, but the Sysop had to use hardware between his Commodore and another platform computer to achieve it. Once we have the ability to connect our Commodore computer directly to the Net, this could be done without any additional hardware or the use of another platform computer.

The road to SLIP or PPP access with our Commodore hasn't yet been paved with yellow bricks, but the glimmer of the Emerald City is visible, shimmering in the distance.

Gaelyne Gasson is the author of "The Internet for Commodore C64/128 Users" and can be contacted via Email at gaelyne@cmdweb.com or visit her web site at: http://videocam.net.au/~gaelyne.

BASIC INSTINCTS

INSIDE BASIC PART TWO

by Doug Cotton

Picking up where we left off last issue, we're going to begin with creating a BASIC program on disk. We'll start with this rather than creating one in memory since the latter is a little more difficult.

For the purpose of this example, let's assume a fairly simple program. In fact, we'll use the simple program line that was presented in the last issue, which was:

```
10 PRINT"HI"
```

This will be simple to use since we already have the byte values which we PEEKed from memory (printed in the previous issue). To begin, let's identify our program and set up a few variables. The variables that we'll need are the starting address for BASIC, the device number of the drive we'll be creating the file on, and a filename for the program.

```
10 REM CREATE BASIC PROGRAM ON DISK
20 :
30 SA=2049 : REM STARTING ADDRESS
40 DV=8 : REM DEVICE NUMBER FOR FILE
50 F$="HI.BAS"+",P,W"
60 :
```

In line 30, the variable SA has been set to 2049 for the starting address of BASIC. While BASIC technically begins at address 2048, programs stored on disk do not contain the zero byte that is always located at 2048, and are loaded instead at 2049 (on the Commodore 64).

In line 40, the variable DV has been used to define the device number as device 8. If you want to use a different device number, just change this variable.

The string variable F$ defines the filename. The P and W paramters that have been tacked on after the actual name indicate that the file should be of program (PRG) type, and that we will want to write to the file when it is opened later in the program.

Now we'll add the main program routine to our listing.

```
100 OPEN8,DV,8,F$
110 AH=INT(SA/256):AL=SA-(AH*256)
120 PRINT#8,CHR$(AL);CHR$(AH);
130 READBY:IFBY=-1THENCLOSE8:END
140 PRINT#8,CHR$(BY);
150 GOTO130
160 :
```

Line 100 opens the file our program will create. In line 110, we turn the start of BASIC address into two bytes to form a low (AL) and high (AH) byte pair. Since these are the first two bytes of any program, we write these to the file in line 120.

The next three lines (130—150) form a loop to read data statments. Each data byte will be checked to see if the end of data has been reached, which will be indicated by a data value of -1. As long as the data we get is some other value, it will be written to disk (line 140), and we'll loop back (line 150) to line 130 to get the next byte of data.

And speaking of data, that's all we need to complete the program. These last few lines provide that, and are commented so that you can easily see what each part of the data is for.

```
200 DATA 11,8 : REM LINE LINK ($0811)
210 DATA 10,0 : REM LINE NUMBER ($0010)
220 DATA 153  : REM TOKEN FOR PRINT
230 DATA 34,72,73,34 : REM "HI"
240 DATA 0    : REM END OF LINE
250 DATA 0,0  : REM END OF BASIC
260 DATA -1   : REM END OF DATA
```

After you have typed in the complete listing, SAVE it so that it can be loaded back later. Once the program has been saved, go ahead and RUN it. Check the directory of the disk drive you have specified in the DV variable, and you should find the newly created program. LOAD and RUN the program to see it operate.

Some Notes

You may have noticed that when we created this program, we assumed that the starting address for BASIC was 2048 ($0800). While this is the case for the Commodore 64 (or 64 mode on a Commodore 128), the starting address for BASIC 7.0 (in the Commodore 128's native mode) is actually higher than that; it begins at 7168 ($1C00).

If you're using a Commodore 128 in its native mode, you'll quickly learn that the program will work anyway—provided you use the 'short' version of the LOAD command (LOAD "HI.BAS",8). This is because BASIC assumes that the program being loaded is to be automatically placed at the start of BASIC memory, unless otherwise instructed. If you use the longer version of LOAD (LOAD "HI.BAS",8,1) then BASIC places the program directly at the starting address specified in the program itself. That is why using the ",1" at the end of a LOAD command should generally be reserved only for machine language programs or modules. Using the long form of loading in this case would work fine on a 64, but would cause the program to be incorrectly located on a 128 in 128 mode.

Please note that we've reworked the BASIC Keyword chart provided in the previous installment of BASIC Instincts. Last time it appeared, it was ordered by byte values to make it suitable for decoding existing programs. The version of the chart included in this issue is ordered

alphabetically by keyword. This version, then, is better suited for creating the code necessary to write a program directly to disk or memory.

As you look through the commands, bear in mind that some commands work only in BASIC 7.0. Check the notes at the end of the chart to help determine which commands these are. Since these command will not work on a Commodore 64, you shouldn't use them when creating Commodore 64 programs.

In our next installment of BASIC Instincts, we'll move on to creating programs directly in memory. We'll also look into a related subject—creating more than one BASIC program in memory, and switching between those programs.

Commodore BASIC 2.0 & 7.0 Keywords & Tokens

Keyword	Hex. Token	Dec. Token	Keyword	Hex. Token	Dec. Token	Keyword	Hex. Token	Dec. Token	Keyword	Hex. Token	Dec. Token
*	$AA	170	DOPEN[1]	$FE $0D	254 13	LOOP[1]	$EC	236	SCNCLR[1]	$E8	232
+	$AC	172	DRAW[1]	$E5	229	MID$	$CA	202	SCRATCH[1]	$F2	242
-	$AB	171	DS$[1,3]			MONITOR[1]	$FA	250	SGN	$B4	180
/	$AD	173	DS[1,3]			MOVSPR[1]	$FE $06	254 6	SIN	$BF	191
<	$B3	179	DSAVE[1]	$EF	239	NEW	$A2	162	SLEEP[1]	$FE $0B	254 11
=	$B2	178	DVERIFY[1]	$FE $14	254 20	NEXT	$82	130	SLOW1	$FE $26	254 38
>	$B1	177	EL[1,3]			NOT	$A8	168	SOUND[1]	$DA	218
ABS	$B6	182	ELSE/BEND[1]	$D5	213	OFF[2]	$FE $24	254 36	SPC(	$A6	166
AND	$AF	175	END	$80	128	ON	$91	145	SPRCOLOR[1]	$FE $08	254 8
APPEND[1]	$FE $0E	254 14	ENVELOPE[1]	$FE $0A	254 10	OPEN	$9F	159	SPRDEF[1]	$FE $1D	254 29
ASC	$C6	198	ER[1,3]			OR	$B0	176	SPRITE[1]	$FE $07	254 7
ATN	$C1	193	ERR$[1]	$D3	211	PAINT[1]	$DF	223	SPRSAV[1]	$FE $16	254 22
AUTO[1,5]	$DC	220	EXIT[1]	$ED	237	PEEK	$C2	194	SQR	$BA	186
BACKUP[1]	$F6	246	EXP	$BD	189	PEN[1]	$CE $04	206 4	SSHAPE[1]	$E4	228
BANK[1]	$FE $02	254 2	FAST[1]	$FE $25	254 37	PI	$FF	255	ST[3]		
BEGIN[1]	$FE $18	254 24	FETCH[1]	$FE $21	254 33	PLAY[1]	$FE $04	254 4	STASH[1]	$FE $1F	254 31
BEND[1]	$FE $19	254 25	FILTER[1]	$FE $03	254 3	POINTER[1]	$CE $0A	206 10	STEP	$A9	169
BLOAD[1]	$FE $11	254 17	FN	$A5	165	POKE	$97	151	STOP	$90	144
BOOT[1]	$FE $1B	254 27	FOR	$81	129	POS[1]	$B9	185	STR$	$C4	196
BOX[1]	$E1	225	FRE	$B8	184	POT[1]	$CE $02	206 2	SWAP[1]	$FE $23	254 35
BSAVE[1]	$FE $10	254 16	GET	$A1	161	PRINT	$99	153	SYS	$9E	158
BUMP[1]	$CE $03	206 3	GET#[4]			PRINT#	$98	152	TAB(	$A3	163
CATALOG[1]	$FE $0C	254 12	GETKEY[1,4]			PRINTUSING[1,4]			TAN	$C0	192
CHAR[1]	$E0	224	GO	$CB	203	PUDEF[1]	$DD	221	TEMPO[1]	$FE $05	254 5
CHR$	$C7	199	GO64[1,4]			QUIT[2]	$FE $1E	254 30	THEN	$A7	167
CIRCLE[1]	$E2	226	GOSUB	$8D	141	RCLR[1]	$CD	205	TI$[3]		
CLOSE	$A0	160	GOTO	$89	137	RDOT[1]	$D0	208	TI[3]		
CLR	$9C	156	GRAPHIC[1]	$DE	222	READ	$87	135	TO	$A4	164
CMD	$9D	157	GSHAPE[1]	$E3	227	RECORD[1]	$FE $12	254 18	TRAP[1]	$D7	215
COLLECT[1]	$F3	243	HEADER[1]	$F1	241	REM	$8F	143	TROFF[1]	$D9	217
COLLISION[1]	$FE $17	254 23	HELP[1]	$EA	234	RENAME[1]	$F5	245	TRON[1]	$D8	216
COLOR[1]	$E7	231	HEX$[1]	$D2	210	RENUMBER[1]	$F8	248	UNTIL[1]	$FC	252
CONCAT[1]	$FE $13	254 19	IF	$8B	139	RESTORE	$8C	140	USING[1]	$FB	251
CONT[5]	$9A	154	INPUT	$85	133	RESUME	$D6	214	USR	$B7	183
COPY[1]	$F4	244	INPUT#	$84	132	RETURN	$8E	142	VAL	$C5	197
COS	$BE	190	INSTR[1]	$D4	212	RGR[1]	$CC	204	VERIFY	$95	149
DATA	$83	131	INT	$B5	181	RIGHT$	$C9	201	VOL[1]	$DB	219
DCLEAR[1]	$FE $15	254 21	JOY[1]	$CF	207	RND	$BB	187	WAIT	$92	146
DCLOSE[1]	$FE $0F	254 15	KEY[1]	$F9	249	RREG[1]	$FE $09	254 9	WHILE[1]	$FD	253
DEC[1]	$D1	209	LEFT$	$C8	200	RSPCOLOR[1]	$CE $07	206 7	WIDTH[1]	$FE $1C	254 28
DEF	$96	150	LEN	$C3	195	RSPPOS[1]	$CE $05	206 5	WINDOW[1]	$FE $1A	254 26
DELETE[1,5]	$F7	247	LET	$88	136	RSPRITE[1]	$CE $06	206 6	XOR[1]	$CE $08	206 8
DIM	$86	134	LIST	$9B	155	RUN	$8A	138	^	$AE	174
DIRECTORY[1]	$EE	238	LOAD	$93	147	RWINDOW[1]	$CE $09	206 9			
DLOAD[1]	$F0	240	LOCATE[1]	$E6	230	SAVE	$94	148			
DO[1]	$EB	235	LOG	$BC	188	SCALE[1]	$E9	233			

NOTES: (1) Commodore 128 (BASIC 7.0) Only. (2) Unimplemented - Token has no function. (3) Reserved keyword for variable. (4) Reserved word made up of a keyword plus text or two keywords combined. (5) Direct mode only.

HARD TIPS

DOWNGRADING THE SID IN THE C-64C AND C-128D

By Doug Cotton

When Commodore first produced the Commodore 64 computer, the new machine quickly caught fire with the public because it offered very advanced sound and graphics capabilities at low price. It didn't take long for programmers to recognize these strengths of the C-64 and begin experimenting with getting more out of the venerable SID and VIC chips.

Initially, new games—the most popular software category of the time—fought for top ratings first by providing better graphics than previous programs. But before long, competition moved to the sound aspects of the programs as well. In time, programmers discovered that the SID chip could actually do more than Commodore themselves had dreamed possible. Not only could it provide some very advanced waveforms, but it could even be programmed to provide speech synthesis! Companies that had put out hardware speech cartridges were hit hard when S.A.M., the "Software Activated Mouth" hit the market. As the years progressed, so did the software, and digitized sound became the latest way to push the SID to its limits.

When Commodore released the C-64c, a cost-reduced version of the original Commodore 64, they also introduced an updated version of the SID chip in which they fixed some hardware bugs found in the original chip. The bad news was that some sounds were quite different under the new chip. Speech synthesis and digitized sounds in many programs were unable to achieve the same volume levels as the would on the older SID chip. Commodore also provided updated SID chips on the Commodore 128D. Programmers were perplexed over the changes, but even worse, users who had upgraded found that some of their programs had sounded much better on their original C-64.

Before we paint the newer SID chips as all bad, however, be aware that some SID programmers like the newer version's abilities to make certain sounds that the older version couldn't produce. But for the most part, newer capabilities have not been an issue, since most users' software collections predate the changes to the SID chip. It is for this reason that we devote this installment of *Hard Tips* on downgrading the SID chip in the Commodore 64c and 128D computers.

Before we proceed with the details, however, be forewarned: to perform this 'downgrade', you need to be reasonably experienced with soldering and desoldering integrated circuits and other components on circuit boards. If you have any doubts about your capabilities in this area, you might rather consider sending your computer to CMD to have them perform the change for you (contact CMD for pricing). If you're planning to perform the modifications yourself, CMD can also provide you with the parts (SIDKIT81, $25.00 plus s/h).

To perform the modifications, follow these steps:

- Disassemble your computer and remove the circuit board from the case.

- Using the diagrams included with this article, locate the 8580 SID chip (U9 on the 64c, or U5 on the 128D). Note: If your SID chip isn't an 8580, you don't need to perform this downgrade!

- If your SID chip is socketed, remove it from the socket. If your SID chip is not socketed, desolder and remove the chip. Note: we often find it easier to 'cut' the chip out by carefully cutting each of

Figure 1: C64c (SID & Capacitors)

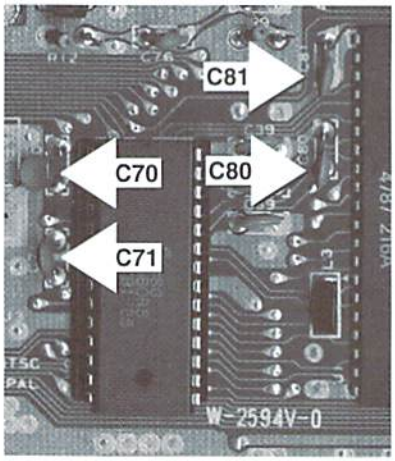


Figure 2: C64c (CR7 Diode)

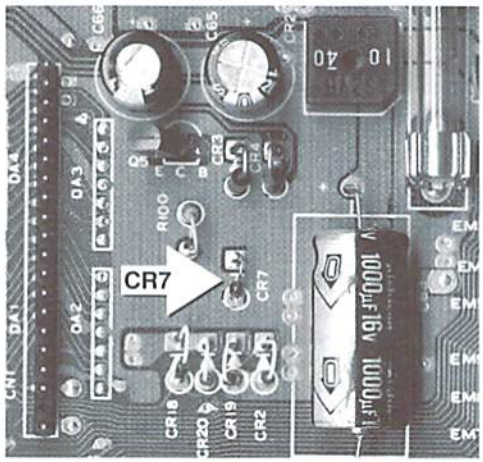
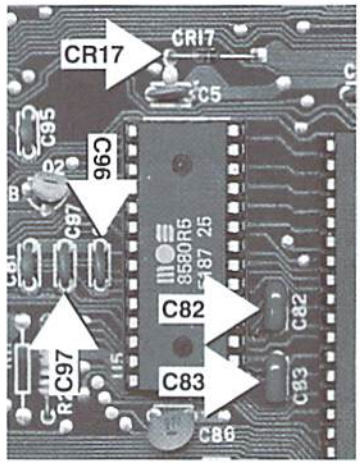


Figure 3: C128D



the pins with side-cutters, and then desoldering and removing each of the individual pins one-by-one.

- Locate capacitors C80 and C81 on the 64c, or C96 and C97 on the 128D. Desolder and remove these, then replace both with 1800pf (182K) capacitors.

- Locate capacitors C70 and C71 on the 64c, or C82 and C83 on the 128D. Desolder and remove these, then replace both with 470pf (471) capacitors.

- If you have a 64c, locate, desolder and remove diode CR7, then replace it with a 12v zener diode (1N5242). Note: the line on the barrel of the diode indicates the polarity; make sure the lead from this end of the diode is soldered into the top pad as viewed in Figure 2 (the one closest to resistor R100).

- If you have a 128D, locate, desolder and remove diode CR17, then replace it with a shorting wire.

- Install a 6581 SID chip. If your SID chip was not socketed, we recommend installing a socket first. That way you can avoid possible damage to the new SID chip while soldering, and you can easily replace the chip later if it becomes defective.

- Reassemble your computer and test it. If the new chip fails, be sure to go back and check your work carefully.

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ASSEMBLY LINE

By Doug Cotton & Mark Fellows

While the subject of device polling has been touched upon in past issues of Commodore world, it has generally been done in BASIC, and has overlooked some of the problems faced with certain devices that can populate the serial bus. This installment of Assembly Line provides machine language subroutines that perform device polling while avoiding some of the problems that can often be assosciated with this function.

Device polling is act of looking at the serial bus peripherals, determining what they are and what device address they have. This is generally a simple task, provided you know what to check for. The routines provided here will correctly identify the following devices: Commodore 1541 (and many 1541-compatible clones), Commodore 1571, Commodore 1581, Commodore 17xx REUs (and clones) running RAMDOS, CMD FD series drives, CMD HD series hard drives, CMD RAMLink, and PPI RAMDrive. In addition, these routines will also indicate the existance of other devices that it cannot otherwise identify.

The real trick here is that these routines also perform a pre-check for a Xetec Super Graphix Gold interface. This interface uses device number 14 to provide fast serial bus operation on Commodore 128 computers. However, since the Super Graphix Gold's "DOS" was not written to be very friendly when it receives commands used in normal device polling, it can cause lockups on the serial bus when such commands are encountered. We circumvent this problem with the pre-check. However, the method of checking used can also create a problem of its own with the HotShot+ interface, so some additional code has been included to avoid this.

The code provided here has been in use for a number of years in CMD's own MCOPY and FCOPY programs, so it has been field-proven to be effective in serial bus polling. The code has been extensively commented, so I won't attempt to explain it further here—see the comments for any further operational details.

```
;devpoll.asm
;copyright 1998 by creative micro designs, inc.

;(constants)

cmdptr  = $fb           ;pointer used for mem read

;(kernal equates)

setlfs  = $ffba
setnam  = $ffbd
open    = $ffc0
clrchn  = $ffcc
close   = $ffc3
chkout  = $ffc9
chrout  = $ffd2
chkin   = $ffc6
chrin   = $ffcf

;these calls should appear as part of your program's
;main initialization code

init    jsr getmode     ;checks mode -- 64 or 128
        jsr devpol      ;checks for sg gold on 4/5

;now we'll build a table of available devices

bldtbl  lda #0
        sta drvbyt      ;initialize drive variable
        ldy #$ff        ;initialize table pointer
-       iny             ;increment table pointer
        sty devpnt      ;and save it
        lda #0          ;initialize
        sta devtbl,y    ;device table
        sta devtyp,y    ;and type table
        jsr finnxt      ;find and poll next device
        cpx #$1f        ;done?
        bcs +           ;yes, exit
        ldy devpnt      ;get pointer
        sta devtyp,y    ;store device type
        txa
        sta devtbl,y    ;store device number
        clc
        bcc -           ;go again
+       rts             ;exit

;the tables will now contain the available devices and
;types with a zero in the devtbl entry to signify the
;end of the list (note that if the first entry is a
;zero, there are no drives)

;(device tables)

devtbl  .buf 23         ;table for device numbers
devtyp  .buf 23         ;table for device types

;types 0=hd, 1=1541, 2=1571, 3=1581, 4=reu w/ramdos,
;5=ramlink, 6=ramdrive, 7=fd, 8=unknown

;(variables)

devpnt  .byt 0          ;pointer into device table
drvbyt  .byt 0          ;current device variable
mrbyte  .byt 0          ;temp storage for mem read
typind  .byt 0          ;type of current device
mode    .byt 0          ;computer mode
flag14  .byt 0          ;flag for sg gold

;(get the computer mode -- 64 or 128)

getmode lda #0
        sta mode        ;clear mode variable
        lda 65533       ;get high byte of reset vector
        cmp #255        ;check for C128 value
        bne +           ;skip if not C128
        sta mode        ;store it if C128
+       rts

;(main routine to check for sg gold)

devpol  lda #4          ;test dev. 4
        jsr tst14       ;test for sg gold
        bmi utl         ;if sgg=dev. 4
        lda #5          ;else try dev. 5

tst14   pha             ;push device number
        lda #0
        sta flag14      ;clear flag14
        sta $90         ;clear status
        pla             ;pull device number

;the next bit is a trick -- talk w/listen sa makes
;regular drives give up, setting bit 7 of $90
;(drive not ready), but the sg gold and hotshot+ are
;stupid, and don't mind this

        jsr $ffb4       ;talk
        lda #$6f
        jsr $ff93       ;listen sa
        lda $90         ;st<128=sggold
        bmi utl         ;or hotshot+

;if an sg gold or hotshot+ was found, then this code
;is executed -- otherwise the bmi utl above exits
```

```
        jsr dotsa       ;send talksa
        sei
        jsr cbyts       ;get first byte from interface
        pha             ;and save it

;now the following reads the remaining bytes from the
;interface -- otherwise the hotshot+ would lock up

-       sei             ;interrupts off
        jsr cbyts       ;get next byte
+       bit $90         ;check status
        bvc -           ;until done
        jsr $ffab       ;then untalk

;now check the first byte returned from the interface
;and if it is a zero, then the device is an sg gold

        pla             ;pull back byte and
        cmp #'0'        ;compare to petascii zero
        bne utl         ;if not, then nevermind
        lda #$80        ;if it is then
        sta flag14      ;set flag14 to avoid dev 14

utl     rts             ;exit routine

;(subroutines for sg gold check)

dotsa   bit mode        ;check mode
        bpl +           ;branch if C64
        jmp $e4e9       ;switch to talk sa -- C128
+       jmp $edcc       ;switch to talk sa -- C64

cbyts   lda #0          ;read bytes for
        sta $a5         ;hotshot+
        bit mode        ;check the mode
        bpl +           ;branch if C64
        jsr $e573       ;set 1 mhz mode and
        jmp $e445       ;get serial byte on C128
+       jmp $ee18       ;get serial byte on C64


;(find next valid device)

finnxt  ldx drvbyt      ;get current device number
        inx             ;increment it
golook  stx drvbyt      ;and store it back
dlook   cpx #$1f        ;is it device 31?
        bcs exdriv      ;yes, better exit
        cpx #08         ;no, so compare to 8
        bcs chksgg      ;not less than 8, proceed
        ldx #08         ;less than 8, make it 8
        bne golook      ;and start over

chksgg  cpx #14         ;is current device 14?
        bne +           ;no, so skip
        bit flag14      ;yes, check flag14
        bmi finnxt      ;flag set, so skip 14
+       jsr chkdev      ;see if the device exists
        bcs finnxt      ;no, then start over
        jsr fintyp      ;yes, then check type
        bcs finnxt      ;if error, try next device
exdriv  ldx drvbyt      ;store device number in .x and
        lda typind      ;device type in .a (see table)
exdrts  rts             ;then exit

;(test for device)

chkdev  stx $ba         ;set current device for os
        jsr opou15      ;open command channel
        php
        jsr clos15      ;close command channel
        plp
        ldx $ba         ;get device number back to .x
        rts             ;exit

;(opens and closes)

open15  lda #15         ;file number 15 in .a
        ldx $ba         ;device number in .x
openax  ldy #15         ;secondary addr 15 in .y
        jsr setlfs      ;set file parameters
        lda #0          ;set length of filename
        jsr setnam      ;to zero
        jmp open        ;and open file

clos15  lda #15         ;close channel 15
closa   pha             ;save .a
        jsr clrchn      ;clear channel
        pla             ;restore .a
        clc             ;clear carry
        jmp close       ;and close

opou15  jsr open15      ;open 15
out15   ldx #15         ;and then
        jmp chkout      ;set output to 15


;(find drive type)

fintyp  jsr open15      ;open 15
        lda #08         ;index into table
        jsr sendmr      ;send mem read
        ldx #03         ;index into table
-       cmp firbyt,x    ;compare first byte
        beq +           ;good, then branch
        dex             ;no match, dec index
        bpl -           ;and check again
        bmi invald      ;none matched, exit

+       txa             ;use result as index
        asl a           ;for comparing
        sta typind      ;further
        jsr sendmr      ;read 2 more bytes
        ldx typind      ;get the index
        beq chkfir      ;x=0 cmd device
        inx             ;otherwise
        inx             ;increment .x twice
chkfir  cmp typbyt,x    ;check against type table
        beq +           ;and branch if equal

        cpx #04         ;else compare .x to 4
        bne chkr1       ;exit if not equal
        dex             ;else reduce .x
        dex             ;by two
        bne chkfir      ;and check again

chkr1   cpx #00         ;cmpare to 0
        bne invald      ;not zero, then unknown

        ldx #14         ;fd index
        cmp #'f'        ;fd?
        beq +           ;yes, chk nxt

        cmp #'r'        ;check for rl/rd
        bne invald      ;if not, unknown
        ldx #10         ;yes, rl index
        lda mrbyte      ;chk rl
        cmp #'l'        ;check for ramlink
        beq ++          ;yes, branch
        ldx #12         ;no, set rd indx

+       lda mrbyte      ;always check the second
        cmp typbyt+1,x  ;byte to be certain
        beq +           ;okay, branch
invald  ldx #16         ;flag as unknown type
+       txa             ;put index in .a
        lsr a           ;and divide by 2
        sta typind      ;then store
        jsr clos15      ;close 15
        clc             ;clear the carry
        rts             ;and exit

;(table for memory read location)

mraddr  .wor $fea4      ;hd
        .wor $e5c6      ;41/71
        .wor $a6e9      ;81
        .wor $0000      ;reu
        .wor $fea0      ;initial test

;(table for drive type id strings)

typbyt  .byt 'hd'
        .byt '4',$b1
        .byt '7',$b1
        .byt '8',$b1
        .byt '31'
        .byt 'rl'
        .byt 'rd'
        .byt 'fd'

;(table of first pass identifiers)

firbyt  .byt 'c',$0d,$ff,'3'

;(memory read subroutine)

sendmr  pha             ;save index into mraddr table
        jsr out15       ;set output for 15
        lda #03         ;number of bytes to send
        ldx #<mrbyt     ;set address of string
        ldy #>mrbyt     ;to output
        jsr sndcmd      ;and send m-r string
        pla             ;restore index
        tax             ;and move to .x
        lda mraddr,x    ;get first byte of addr
        jsr chrout      ;and send it
        lda mraddr+1,x  ;get second byte of addr
        jsr chrout      ;and send it
        lda #02         ;set up to read 2 bytes
        jsr chrout      ;send it
        jsr clrchn      ;reset i/o settings
        ldx #15         ;set 15
        jsr chkin       ;for input
        jsr chrin       ;get first value
        pha             ;save it on stack
        jsr chrin       ;get second value
        sta mrbyte      ;save it
        jsr clrchn      ;clear i/o settings
        pla             ;retrieve first value
mrrts   rts             ;and exit

mrbyt   .byt 'm-r'      ;string for memory read command

sndcmd  stx cmdptr      ;set up zpage pointer
        sty cmdptr+1    ;to command string
scptr   tax             ;get number of bytes
        ldy #0          ;set up index of 0
-       lda (cmdptr),y  ;get character indirect
        jsr chrout      ;and output it
        iny             ;increment y index
        dex             ;decrement x index
        bne -           ;loop if not done
        rts             ;or exit
```

816 BEAT

THE SUPERCPU STEPS UP TO VERSION 2

By Doug Cotton

CMD has recently released the next generation of SuperCPU accelerators, the SuperCPU v2. In addition to providing a Commodore 128 option, the version 2 hardware and firmware also replace the older SuperCPU 64, providing enhancements and features that apply to both SuperCPU models. In this installment of 816 Beat, we'll not only look at new additions in v2, but also point out some things that have changed.

SuperCPU 128

Of course, the big news is that the SuperCPU 128—the only accelerator ever created for the Commodore 128's native mode—is now a reality. The new SuperCPU v2 hardware sports 256K of Static RAM (SRAM) on its main board, allowing it to emulate all the RAM and ROM of both the Commodore 64 and 128.

As with the original SuperCPU 64, two of the 64K banks of RAM (128K) are mapped into the 65816's Bank 0 and 1. However, the additional 128K added to provide Commodore 128 compatibility is not mapped in this manner, and is instead switched into Banks 0 and 1 in place of the original 128K as necessary. Under this scheme, the 65816's Bank 0 always contains computer RAM in any mode; in 128 mode, this will be either the 128's Ba nk 0 or Bank 1 RAM, depending on which is active. The 65816's Bank 1 RAM will contain ROM data; by default the ROM data present will always be the C-64 ROM except when given C-128 ROM segments are mapped in while using 128 mode. These ROM images are further mirrored into the 65816's Bank 0 RAM as necessary to make a composite image of the memory as it would exist on a C-64 or C-128 computer.

While the overall scheme may seem somewhat complex, it maintains the ability to modify ROM segments directly in the 65816's Bank 1, and provides for mapping in 65816 expansion RAM beginning at Bank 2. The latter serves to maintain a standard memory map for both the SuperCPU 64 and SuperCPU 128, regardless of vintage (v1 or v2).

More Optimization Capabilities

Those familiar with the original SuperCPU 64 (v1) no doubt know that it has four possible configurations for mirroring of memory. These configurations are known as the 'Optimization Modes'. In the v2 hardware this has grown to eight 'base' configurations, most of which offer one or two special flags that bring the total number of optimization configurations available to 11 in 64 mode, and 19 in 128 mode. The table, 'Important SuperCPU Memory Locations' provides further insight into the configurations available.

Despite the addition of many new Optimization Modes, the new v2 hardware maintains backward compatibility with all modes available in the original SuperCPU. Any changes made to the new Enhanced Optimization Register ($D0B3) are reflected into the old Optimization Mode Flags ($D0B4), and vice-versa. This means that programs written to use the older registers will still achieve the desired results under the new version.

In looking over the new Optimization Modes, you'll see the special flags, labelled B and Z. The B flag controls the C-128 RAM Bank, so is only useful in 128 Mode on a SuperCPU 128. The Z flag controls mirroring of Zero Page and Stack ($0000-$01FF). Turning off mirroring of these latter areas vastly increases the performance of programs since many of the microprocessor's instructions use these areas of memory. This particular optimization has been included in the default setting of the SuperCPU v2, meaning that programs will generally run faster than ever without any modifications by the user.

Bear in mind that Optimization Modes only affect the true physical addresses specified by each; if you use the Commodore 128's ability to relocate Zero page to some other physical address, that area won't be optimized by the Z flag optimization.

In addition to having all the new Optimization Modes, the new v2 release has made accessing some of the more useful ones more easily available to users by setting up a key combination for switching between modes. From BASIC's direct command mode, using the CONTROL and BACK ARROW keys together will toggle through the available modes. (Note: Like many of the JiffyDOS key commands, this function doesn't work once a program is running or while in quote mode).

Other Registers

Another new register added in the v2 hardware is the SuperCPU Mode Detect Register ($D0B2). This register lets you determine if a detected SuperCPU is a v1 or v2, and if it is a v2 you can also find out whether it is in 64 or 128 mode.

There are no other additional registers, but there has been one other change to an existing one. In the register at location $D0B6, the bit that previously held the status of the reset switch (bit 6) is no longer valid in v2.

Timing Notes

Several timing changes have been made in the v2 hardware to improve performance. Probably the most beneficial is that color RAM is no longer treated as I/O, but instead as standard mirrored memory. This allows full speed reads of this area, and writes will also be at full speed, provided the cache isn't waiting for another operation to complete.

Access to the special RAM in the I/O area ($D200-$D3FF) now takes only 1 cycle (previously it required 1.5 cycles). The registers in the $D07x and $D0Bx ranges have also been optimized to work at full speed (any previous read or write to these registers caused the system to wait for the next 1 MHz cycle). Location $01 has also gotten a boost to full speed in 64 mode (previously writes waited for the next 1 MHz cycle, while reads have always been at 20 MHz.

The creation of a 128 mode in the SuperCPU 128 has brought about some additional special timing requirements. Reading or writing locations $01 or $FF00 in 128 mode causes the SuperCPU to wait for the next 1 MHz cycle. Reads from $D600, $D601 and $FF01-$FF04 also cause the SuperCPU to wait for the next 1 MHz cycle, though writes to these locations use the cache. Note that after any actual VDC chip access, further VDC access is blocked during the following 1 MHz cycle to allow the video chip enough time to complete the operation.

Important SuperCPU Memory Locations

Location		Purpose
$D074[1]	(53364)	VIC Bank 2/GEOS Optimization (mirror $8000-$BFFF)
$D075[1]	(53365)	VIC Bank 1 Optimization (mirror $4000-$7FFF)
$D076[1]	(53366)	BASIC Optimization (mirror $0400-$07FF)
$D077[1]	(53367)	No Optimization (mirror all memory) (**v1 default**)
$D07A[2]	(53370)	Software Speed Select - Normal (1 MHz or 2 MHz in 128 Fast mode)
$D07B[3]	(53371)	Software Speed Select - Turbo (20 MHz) (*$D079)
$D07E[2]	(53374)	Hardware Register Enable
$D07F[2]	(53375)	Hardware Register Disable (*$D07D)
$D0B0[6]	(53424)	SuperCPU Mode Detect Register
		00xxxxxx = SuperCPU v2 in 128 mode
		01xxxxxx = SuperCPU v2 in 64 mode
		11xxxxxx = SuperCPU v1, no SuperCPU, or SuperCPU disabled
$D0B2[4]	(53426)	Bit 7: Hardware Register Enable Flag (1=Enabled)
		Bit 6: System 1 MHz Flag (1=Enabled)
$D0B3[5,7]	(53427)	Enhanced Optimization Register (**v2 only**)
		00xxx1BZ = VIC Bank 0, $0000-$3FFF
		01xxx0B0 = VIC Bank 1, $4000-$7FFF
		00xxx0B0 = VIC Bank 2/GEOS, $8000-$BFFF
		01xxx1B0 = VIC Bank 3, $C000-$FFFF
		10xxx0B0 = BASIC Opt., $0400-$07FF
		11xxx00Z = No Opt. All Mem., $0:0000-$1:FFFF (**v2 default**)
		11xxx1BZ = No Opt. per Bank, $0000-$FFFF
		10xxx100 = Full Optimization (no mirroring of any memory)
$D0B4[5]	(53428)	Bits 7 & 6: Optimization Mode Flags:
		00xxxxxx = VIC Bank 2/GEOS Optimization Enabled
		01xxxxxx = VIC Bank 1 Optimization Enabled
		10xxxxxx = BASIC Optimization Enabled
		11xxxxxx = No Optimization
$D0B5[6]	(53429)	Bit 7: JiffyDOS Switch Flag (1=Enabled)
		Bit 6: Speed Switch Flag (1=Normal, 0=Turbo)
$D0B6[6]	(53430)	Bit 7: Processor Emulation Mode Flag (1=Emulation)
		Bit 6: Reset Switch Flag (1=Switch pressed) (**v1 only**)
$D0B8[4]	(53432)	Bit 7: Software Speed Flag (1=Normal, 0=Turbo)
		Bit 6: Master Speed Flag (1=Normal via any source)
$D0BC[5]	(53436)	Bit 7: DOS Extension Mode Flag (1=Enabled)
		Bit 6: RAMLink Hardware Registers Flag (1=Enabled)
$D200-$D2FF[4]	(53760-54015)	System RAM
$D300-$D3FF[5]	(54016-54271)	User RAM (available for user programs)

Notes:

[1] Write only, hardware registers must be enabled to activate location.

[2] Write only, active with hardware registers enabled or disabled.

[3] Write only, active with hardware registers enabled or disabled, but does not over-ride hardware Speed switch.

[4] Read only with hardware registers disabled, Read/Write with hardware registers enabled, write access reserved for system only.

[5] Read only with hardware registers disabled, Read/Write with hardware registers enabled.

[6] Read only with hardware registers enabled or disabled (write with hardware registers enabled has no effect).

[7] Changing values in this area affects all other optimization mode registers, and changing other optimization mode registers affect this location. The B flag assigns control of this register to a specific Commodore 128 Bank (0=Bank 0, 1=Bank 1), while the Z flag contols mirroring of Zero Page and Stack memory ($0000—$01FF) (0=mirroring on, 1=mirroring off). Default for Z is 1, B is 0.

* Denotes a duplicate register location.

IMPORTANT NOTE: Enabling the SuperCPU hardware registers also causes some changes in the Kernal ROM memory map ($E000-$FFFF). To avoid problems, do not leave the hardware registers enabled any longer than necessary. Also note that mirroring of I/O is always performed when I/O is mapped in.

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