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## Living the 8-Bit Dream in a 32-Bit World

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*A Desire for Simplicity, Nostalgia and Classic Design Attracts Users to Vintage Computers*

By **JENNIFER 8. LEE**

**A**s a mathematician at Los Alamos National Laboratory, Steve Judd harnesses the power of Unix work stations and Cray supercomputers to detect and prevent the proliferation of chemical and biological weapons.

When he goes home, he basks in the light of his 15-year-old Commodore computer, a one-megahertz machine with 64 kilobytes of RAM. It can move chunks of data in the same size packages as a Nintendo Game Boy and has 3 percent of the memory capacity of a Palm III organizer.

Judd creates three-dimensional graphics on his obsolete Commodore and calls it a real programming challenge. "It's like building a radio from scratch," he said. "You are designing from the most fundamental level. You have to take advantage of every ounce of the computer."

Fender Tucker, who runs a Commodore software company called Loadstar, said, "Commodores are for people who aren't all that sure that the computer revolution has made our lives better."

Thousands of people appear to have turned to old computers (or stuck with them) out of a feeling of nostalgia, a desire for simplicity and an appreciation for classic design.

In the realm of digital machines, where today's computer is out of date tomorrow, there can be great satisfaction in taking a digital Model T out for a spin.



Rob Kinmonth for The New York Times

The world of Commodore 64 fans includes Douglas Cotton, editor of *Commodore World* magazine and technical director of Creative Micro Designs.

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Douglas Cotton, editor of Commodore World magazine, estimates that a million Commodores are still in service around the world. Their owners include people who remember their first computers more fondly than their first girlfriends (most users are men), as well as people who have handed them down to their children or have set up miniature computer museums in their basements, much to the dismay of their wives.

And it's not only the Commodore. Old Apple computers and Sinclair Spectrums are also popular.

"Some people like to drive classic cars, like the 60's-era Mustang or the original Beetle," said Scott Gamon, 24, who still uses an Apple II GS. "I think the main reason is that the cars are classic vehicles that made history. The Apple II computer is the same in the computer world."

Some owners are active users of the old computers, and some participate in international programming competitions. These are not people who can't afford a new computer or don't know how to use them. Many actually own up-to-date computers that are hundreds of times as fast and much more powerful than their old ones, but they keep their eight-bit machines around to remind them how they started with computers.

"If I didn't buy that machine with my paper-route money when I was 11, I likely wouldn't have gotten into computers, a university scholarship and a decent-paying job," said Robyn Harbron of Thunder Bay, Ontario.

Cotton, who is also technical director of Creative Micro Designs, a Commodore hardware company, said, "We have a number of people who have called us up saying, 'Windows is nice for work, but I miss that old Commodore.' "

A number of fans of eight-bit machines are sophisticated programmers who praise the computers' timeless elegance and efficiency.

"You don't say Mozart, Shakespeare or van Gogh are good for their time," Judd said. "They are just plain good. I make the claim for the Commodore 64."

All software, whether Windows 98 or Lotus Notes or Doom, is based on simple mathematical calculations like addition and multiplication. Computers express information in binary numbers; each digit is a 0 or a 1, and each place is a power of 2. Eight-bit computers handle data in binary numbers that have eight digits. For large calculations, an eight-bit computer has to break down the problem into simpler pieces, and that is one factor that makes eight-bit computers slow, compared with modern 32-bit machines.

But the biggest reason for the sluggishness is that those old computer chips did not have many transistors, or switches, and the transistors they did have were far apart, lengthening the paths signals had to travel. Modern chips pack transistors tightly together to speed up processing times. In addition, internal clocks, which provide the heartbeat for

computer instructions, are several hundred times faster in today's PCs than in yesterday's eight-bit computers.

Many users insist that the eight-bit classics are on the verge of becoming collectibles. Searches on auction sites like Ebay unearth hundreds of items in the classic realm, like floppy disks, printers and actual computers, for generally low prices.

Proponents of trailing-edge technology have their own magazines, conventions, weekly online discussions, Web sites and newsletters. In Europe, dozens of programmers meet regularly for competition parties, where they see who can stretch the capacities of the eight-bit computers the furthest. Some are on a crusade, contending that the old computers should be preserved for posterity. The Vintage Technology Center, a computer nostalgia group in Santa Clara, Calif., recently announced plans to build a supercomputer out of Commodore 64's. "Sixty-four 64's" is its motto.



Guy Ambrosino for The New York Times

Steve Judd uses state-of-the-art computers as a mathematician at Los Alamos National Laboratory, but he prefers a Commodore 64 at home.

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All of that would be mere nostalgia, or a hobby like collecting Pez memorabilia, except that the eight-bit die-hards actually use their computers. In a sense, their devotion to the simple machines is an active refutation of the Wintel world of quick obsolescence that frustrates many computer users.

In the early days, programmers looked for creative software solutions instead of glitzier hardware. "In a way it was simpler back then," said Lane Denson, a Nashville farmer who has set up a computer museum in his basement. "You didn't have 20 or 30 sound cards and you didn't have to worry about upgrading every other week."

At a time when mega, giga and tetra are the popular prefixes, the software available for the kilobyte clunkers is surprisingly sophisticated. Commodore users can send faxes via modems, use laser printers and use a mouse to maneuver through an operating system that looks a lot like Windows. And their computers can act as hosts for Web pages. Accessories that increase the capacities of the old machines are also available, including one that speeds them up by a factor of 20. Maurice

Randall, who has an auto repair shop in Charlotte, Mich., uses his Commodore for all facets of daily computing, for things like designing newsletters and writing HTML pages. "If you don't need to do a lot of high-powered graphical work, they're perfect," Randall said. "They don't crash. They don't have viruses, and they don't break down as often."

The most popular eight-bit computers are the Commodore 64, of which 20 million units were sold from 1982 to 1992; the Sinclair ZX Spectrum, which was the most popular computer in Britain in the mid-1980's, and the Apple II line, which went on the market in 1977 and became immensely popular for its educational software. Production had stopped for all these models by the early 1990's because of pressure from the I.B.M. compatibles.

Now as then, the various computer camps are fierce rivals. European Spectrum fans periodically invade online discussion groups of Commodore users, and vice versa -- each group engaging in the electronic equivalent of nose-thumbing.

"You can talk about my mom all you want, but don't insult my computer," Judd said.

Many programmers insist that the limits of the old machines force programmers to be more resourceful. Many of them, like Randall, who spends 40 to 50 hours each week programming, write in assembly code, the most fundamental programming language, because it takes up less space than higher-level languages.

"Using assembly language, I can make the code real tight and small on a Commodore," Randall said. The program he uses to send faxes via modem is only 56 kilobytes in size. His software releases, including a fax program and an updated operating system that looks much like Windows, earn him more than \$20,000 a year.

For some, eight-bit programming represents a return to computing as a personal experience and a move away from being a technodrone in an

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## FINDING THEM

*If you want vintage computers or their components, there are several Web sites where you can investigate and purchase items. Here are a few:*

### CREATIVE MICRO DESIGN

[www.cmdweb.com](http://www.cmdweb.com)

One of the largest Commodore hardware retailers, with a wide selection of computers, disk drives, software and devices.

### READY ACCESS MEMORY

[www.raminc.com](http://www.raminc.com)

A specialist in Apple II and Macintosh hardware and accessories.

### LOADSTAR

[www.loadstar.com](http://www.loadstar.com)

A distributor of new Commodore software to subscribers; publishes newsletter.

### MAURICE RANDALL

[people.delphi.com/arca93/](http://people.delphi.com/arca93/)

A programmer who sells Commodore programs like fax software and an updated Windows-based interface.

### COMMODORE EMULATOR

[www.fatal-design.com/ccs64/](http://www.fatal-design.com/ccs64/)

Considered one of the best Windows-based Commodore 64 emulators (programs that mimic the 64 operating system).

### SPECTRUM EMULATOR

[www.philosys.de/~kunze/xzx/](http://www.philosys.de/~kunze/xzx/)

One of the most complete Sinclair emulators for Unix, with excellent sound and graphics support.

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information economy. "Before, it was very much discovering and experimenting for your own benefit," said Mark Lair, 40, of Dallas. "Now we're in a service industry. Most of us programmers are providing for other people rather than ourselves."

### **Commodore 64: Crunching With the Oldies**

The Commodore 64, first released in 1982, has maintained its popularity among a small group of dedicated users. Below is a comparison of the technical specifications for the original model alongside some more contemporary digital products.

#### **PROCESSOR**

Commodore 64: 8-bit  
Nintendo Game Boy: 8-bit  
Standard PC desktop: 32-bit

#### **RANDOM ACCESS MEMORY**

Commodore 64: 64 kilobytes  
Palm III: 2,048 kilobytes  
(minimum)

#### **CLOCK SPEED**

Commodore 64: 1 megahertz  
Standard PC desktop: 233 to  
550 megahertz

#### **MONITOR**

Commodore: 16 colors  
Standard PC video card: 65,536  
colors

#### **MUSCLE**

Number of Commodore 64's it  
would take to get the processing  
strength and memory required  
to run ...

MS-DOS: 15

Microsoft Word: 1,000

Lotus Notes: 4,000

But others acknowledge that there is not a high demand for eight-bit programmers. "Yes, I'm a Sinclair fan, but to earn a living, I need to remain up to date in a rapidly evolving industry," said Richard Jordan, 26, a programmer in Britain who owns several Spectrums.

Eight-bit computers draw their biggest chunk of fans because of the classic video games they play. Fans say the older games, unadorned by fancy graphics and sound effects, focused more on game play. The result, they contend, was games that transcend their technological simplicity.

A few times each month, Jeff Lewis, 35, goes into his basement to play some of the hundreds of Commodore 64 games he has accumulated. His wife, Dianna, refers to the computer, which is still connected to a working dot-matrix printer, as a "Commodore shrine." "She actually thinks I'm kind of nuts for keeping it up," said Lewis, who lives in a suburb of Cleveland. "I just tell her it's part of my childhood."

For all those who actually own old computers, there are hundreds of thousands more who pretend that they do by using a generation of emulators, which allow the 32-bit PC's to imitate primitive Commodores, Spectrums and Apples. Thousands of old games are available for downloading on the Web.

Despite the number of eight-bit admirers, the most dedicated enthusiasts sometimes bemoan the skewed demographics of their ranks.

Oyvind Vevang, 20, of Haugesund, Norway, meets many friends though a common interest in classic video games,

but they are almost all male. Vevang lamented, "If more girls were interested in this, I'd have one hell of a pickup trick!"