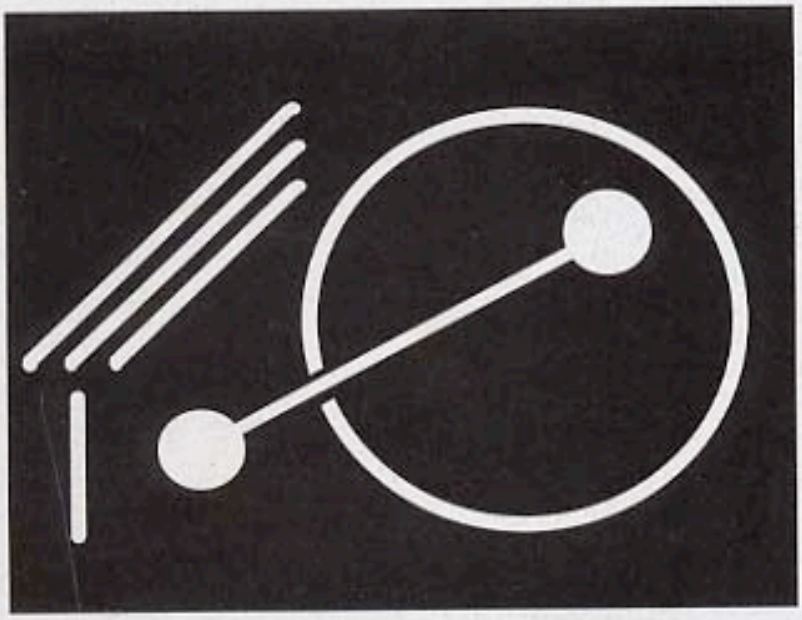

BLACKSBURG
electronic village

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The Global Computer

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If we have learned anything in Blacksburg over the past five years, it is that the current desktop computers are not suitable for use by normal people. By normal people I mean people that are not employed by the computer hardware and software industry or that do not make their living primarily from the support, development, or maintenance of computers and information systems.

Although there is some progress in improving ease of use with new products like the Apple iMac, the desktop computing paradigm is based on a fifty year old model of computing that was designed for computer professionals, not school teachers, grandmothers, children, office workers, and everyone else.

Even in Blacksburg, where more than 83% of the population was online at the end of 1997, computers continue to aggravate as much they serve us. The most common (and tragic) refrain from Blacksburg Internet users is:

"I love my email, and I hate my computer."

Why should such a useful tool like the computer create such antipathy and ambivalence among those it is designed to serve? In short, it should not, and need not. The computer industry has become chained to it's own success, and now fears changing or improving systems in any dramatic way because any company that stops supporting the current (grossly inadequate) desktop computing model risks losing market share.

Computers are the first tool designed by human hand that has no fixed purpose; computers can be (and often are) simultaneously a writing machine, a calculating machine, a communications machine, a controller of other machines, and any other function we care to ask it to do.

The remark from Blacksburg users about their love of email (communicating with others--a fundamental human activity) and their hate of the machine hints at what the computer must become. The killer application that will bring computers and computing to everyone is not some advanced 3-D/multimedia/audio/video software gimmick--the killer app is email, a twenty year old technology. This is not likely to change for a long time, because as computers continue to evolve and the formats to store and hold information continue to evolve, email is and will be the lowest common denominator for human to human communication.

There are, perhaps, about 500 million desktop computers in the world. What this means is that most humans do not have a computer yet. It also means that desktop computers are and will be particularly unsuitable for most of those humans. Most humans in the world live in places where electricity is only occasionally available, if at all. A desktop computer without reliable AC power is a useless ornament. Desktop computers have also been designed for climate controlled environments. Extreme heat, cold, or high humidity renders them useless.

The software we expect people to use is also grossly inadequate. People in Blacksburg, with all the advantages of a high literacy rate, nearby help in the form of neighbors and friends, and computer experts around every corner, are cursing their computers when upgrades and system software changes are required.

How do we expect the rest of the world to use these systems?

Furthermore, the cost of software for desktop machines is extraordinarily expensive. We are very close to the time when the software we use costs more than the machine itself. Why is this? It is because many software companies use frequent releases and expensive upgrades to continuously increase (and often inflate) the value of their companies instead of focusing on high quality software.

A word processor is nothing but an intelligently ordered collection of bits, and should cost no more than one dollar if sold in sufficient quantity and if we were willing to use it for several years without an upgrade. If just half the world's population had computers (about 3 billion people, I could make a tidy living selling software for a dollar apiece to a very small fraction of those users.

We have the technology and expertise today to build a computer for $100 that could be used by virtually everyone in the world. How can this be true? Here are some clues:

- ❑ The Apple Newton weighs one pound, runs for months on 4 AA batteries, and has all the functions needed by an average human, including word processing, email, a Web browser, a spreadsheet, and a database. It can be powered by a cheap solar panel.

- ❑ The 3Com Palm Pilot weighs only a few ounces, also runs on batteries, and fits in shirt pocket. While it does not have all the features of the Newton, it is still quite powerful.

- ❑ VCRs have exceedingly complex, high tolerance moving parts, which makes them more difficult to manufacture than solid state devices with no moving parts, yet routinely sell now for less than $90.

The Newton and the Palm Pilot prove that the technology exists to implement the features needed in the Global Computer (GC), and the widespread availability of VCRs at low cost proves that anything, if manufactured in sufficient quantity, can be made cheaply.

What is missing is an organization willing to bet on the creation of a new market for the GC by placing an order large enough to interest one or more companies in manufacturing the GC.

A mere $10 million dollars (US) would purchase 100,000 GCs for a per unit cost of $100US. Within eighteen months, the cost would fall by a third and continue to fall, as does the price of all electronic equipment. For $10 billion dollars (a rather small sum, actually), one hundred million GCs could be built and distributed to the information have-nots of the global village. This single act would irrevocably change the world in many large and small ways.

Here are the specifications for the Global Computer:

Hardware

- ❑ 640 x 320 greyscale LCD touch panel (approximately 10 cm x 12.5 cm)
- ❑ 200 Mhz processor (more than adequate for any application needed)
- ❑ 32 meg of solid state storage
- ❑ Two PCMCIA card slots to add additional functionality
- ❑ Low speed serial port for keyboard and external device control
- ❑ Ethernet port (10BaseT)
- ❑ Irda (infrared) port for local networking to other machines and printers with cables
- ❑ Operates on rechargeable batteries and/or solar power
- ❑ Weight: .65 kilograms, and all parts recyclable or reusable (as is practical)
- ❑ Repair and/or replace all parts with a simple toolkit costing less than $25US

Software

- ❑ Small, fast operating system with embedded object database and built in scripting language for development of new functions and applications
- ❑ Handwriting recognition
- ❑ Unicode support for all human languages
- ❑ Word processing with the following features: Formatting text for letters, reports, and documents; simple text editor for programming and scripting; HTML/XML editor for Web and data publishing
- ❑ Spreadsheet with all normal features
- ❑ Database with scripting and development environment for adding new information applications and uses. Standard database tools would include an address book and a time and schedule manager.
- ❑ Email client with support for all standard Internet mail and information exchange protocols, with tight integration with all other functions, applications, and services on the machine.
- ❑ Web browser that conforms strictly to W3C specifications with no additional non-standard features or functions.

Changing the way we think...

The availability of the Global Computer would change the way we solve problems in the world. One of the first new applications for the GC might be a program designed to teach disadvantaged children to read and write. The GC would have the capability of acting as a "book"--perhaps the first book for many in the world. But this book could contain dozens of texts at one time, and new texts could be added for pennies (if they even cost that much). And this book could continuously modify itself to become more challenging as young readers expand their vocabulary, learn sentence structure, and begin to write.

GCs could contain health information--how to care for diseases and infections of early childhood, routine first aid procedures, and could be powerful diagnostics aid for rural health nurses and aids.

With the addition of a plug-in wireless transceiver, GCs could provide GPS (Global Positioning System) information, act as pagers and telephones, and provide state of the art telecommunications tools in areas where none exists today. GCs could act as machine and process controllers for manufacturing.

To do this we do not have to abandon our current desktop computers, but we must admit to ourselves that it is time to move on, and design information tools for all of humanity, not just a few of us.