Portables—1984 and Beyond

Idea-Processing Software and Portable Computers

The new wave of computers demands new software

by David Winer and Peter Winer

Imagine you've arrived at a business appointment 10 minutes early. Instead of killing time flipping through a magazine, you reach into your briefcase and pull out a portable computer. You turn the power on and move the cursor through an outline of the points you want to cover in the meeting.

After a small reorganization (you wanted to discuss the project schedule after discussing personnel requirements), you move the cursor down to the financial-projections section and press the key marked Spreadsheet. Instantly, a small window opens up on the screen, and you try a few calculations and decide that your assumptions make sense. Turning the power off, you spend the next five minutes browsing through a magazine.

In 1977, Alan Kay (then at Xerox's Palo Alto Research Center and now chief scientist at Atari) speculated about the design and use of portable computers. It was just speculation then, but now, in 1984, it's real—people are buying and using portable computers that are very much like the "Dynabook" that Kay described.

1984 is the year that the personal computer leaps off your desktop and into your briefcase, your knapsack, or your shopping bag. Before facing the wide-open future of software for portable computers, let's look at the history of portable computing.

A Short History

The first portable computers existed before personal desktop computers, before Wordstar and Visicalc and even CP/M. Texas Instruments' Silent 700 terminal, with a built-in modem, a full keyboard, and a thermal printer, was portable, even though it weighed almost 50 pounds. It had a handle on it; you were *supposed* to carry it around with you. In 1973, some people actually did, risking sore arms and back. The convenience of carrying around computer power was worth some discomfort.

Then came the personal computers, desktop machines made by Apple, Commodore, Radio Shack, then IBM, and so on. By 1981, some even had handles (e.g., Osborne and Kaypro). This meant you could carry "transportable" desktop-computer power somewhat less painfully (the Compaq Portable Computer, introduced in 1982, weighs only 28 pounds).

Transportables aren't fully portable. Like old tabletop radios, they're too heavy to be carried conveniently, and they must be plugged into a wall socket. Transportables haven't begotten new types of software; they come bundled with the usual desktop software (word processors, spreadsheets, database packages) and the usual software support structures (CP/M on the low end, spelling checkers and program generators on the high end). So much software comes bundled with the transportables that the market for software specific to them has never developed substantially. Even Compaq, which bundles only the operating-system software and a disk-based version of BASIC, has little software built specifically to exploit its transportability.

This trend is not surprising. The manufacturers of transportables spend a lot of advertising dollars to portray their machines as nothing more, nothing less, than transportable clones of the desktop machines

they are emulating. This is an effective short-term strategy, but in the long term it has caused software manufacturers to ignore the special communications capabilities that many transportable units have.

In 1983, the first useful portable computer, the Radio Shack Model 100, was introduced. Manufactured in Japan by Kyocera and marketed in the U.S. by Tandy, the Model 100 has caught on in a spectacular manner and points the way toward truly convenient portable computing.

A Successful Design

Why was the Model 100 such a breakthrough? Basically, there are three reasons: its screen, its keyboard, and its software. Before the Model 100, portables typically had much smaller liquid-crystal display (LCD) screens. The Epson HX-20 with its 4-line by 20-column display can't compare with the 8-line by 40-column display of the Model 100. For most people a 4 by 20 display isn't big enough. An 8 by 40 screen is barely adequate, but on the Model 100 it is workable. The smaller screens on other computers fail to meet the requirements of effective personal computing.

The keyboard on the Model 100 uses the standard QWERTY layout and has eight function keys, four arrow keys, and several dedicated function keys. You can touch-type on this keyboard; the full-size keys have a solid feel.

The system software of the Model 100 is stored in ROM (read-only memory). Turning on the machine automatically takes you into the top level of this software. From there, you can move a cursor over a menu of files, which can be BASIC programs or text files. You can edit a text file, run a BASIC program, or search a text file in several ways. Terminal software is included, enabling file transfers over the built-in modem, serial port or parallel port, and remote access to computer networks and bulletin boards.

Although significant, the Model 100 is just a transition product. An effective portable of the future will have a full 25 by 80 screen, more memory, a 16-bit processor, and software that is better adapted for portability. The year 1984 is when such a portable, weighing less than 10 pounds, will appear on the market. How will such a computer fit into our lives?

Applications

Clearly, as the Model 100 illustrates, software for portable computers is different from software for desktop computers. The companies behind the machine invented a new style of portable computer—one intended to assist in a broad range of applications including BASIC programming, text editing, appointment scheduling, name and address lookup, and communications.

Let's consider the problem of designing software for the ideal portable, one with sufficient memory (say 256K bytes) a faster processor (8086 or 68000), a larger screen (25 by 80), and maybe even a disk drive.

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How would software for this portable be designed?

Before implementing the first prototype, any good software designer will sit down and pose a few crucial questions dealing with the "who, what, why, and where" of the software product.

Who will be using the software? How much experience do they have with personal computers? How old are they? Are they male or female? How much education do they have? How much money do they make?

What will they do with the software? Should the software be targeted at a particular task?

Why are they using the computer instead of paper and pencil?

Where will the computer be used? Now that we're designing software for portable computers, we have to consider "laptop," "bedtop," "beachtop," "coffee-tabletop," and "floortop" use.

To be effective, the software for a portable computer has to be adaptable to a variety of situations, therefore it has to accommodate a variety of information structures. Standalone software that's simple enough to be used on the run must also be capable of producing sophisticated results. It must be simple, with small reference cards instead of extensive users manuals. The best portable software will appeal to the same broad market in which Atari and Coleco video-game machines sold in 1981. Simplicity will be one of the most significant factors in the success of portable software.

Our informal interviews with users of the Model 100 have yielded some clues to the who, what, why, and where of portable software.

Today, the primary users of portable computers are people who also use desktop computers. Therefore, a highly valued feature is the ability to upload and download information between the portable unit and the desktop unit. But eventually, just as portable radios and portable cassette players created their own markets, portable computers will appeal to people who aren't currently using desktop computers.

Most Model 100 owners use the machine for fact gathering, notetaking, simple calculating, organizing, and thinking, with little or no BASIC programming. (Many said they use the BASIC interpreter as a calculator, for computing ratios or summing numbers.) Our interviews indicated that the text editor is the program used most often; name/address lookup and scheduling are the programs used least often. There was not much demand expressed for full-blown word-processing, and spreadsheet capability was considered important only by "spreadsheet people." The need for a relational database package (such as dBASE II and PFS) was expressed by consultants with extensive bases of information to draw from.

Most users said they enjoy the convenience of a portable computer. Portables are also used to fill small gaps of time, time that would otherwise be wasted. There seems to be no limit on where a Model 100 is used: airplanes, podiums, parties, waiting rooms, restaurants, and hotel rooms.

A Design for Portable Software

Now we have a feel for the who, what, why, and where of portable computing. After talking with users of the current technology, we're ready to embark on some speculation about the future of portable software.

Will conventional database managers be the best operating software on portables? Probably not. Database-managing packages require that organization be preplanned, that all manipulation of structure take place *before* any information is entered. Database products such as dBASE II and PFS require that each fact or idea fit into a given layout or "template." The implementation of this type of database, no matter how user-friendly, can serve effectively only for applications such as accounting, mass scheduling, and mailing lists, in which the format of all information can be determined in advance.

More appropriate for the user of a portable computer is a database system that accommodates flexible organization and reorganization of concepts, ideas, or outlines and is not limited to records, fields, and files. A system should let a small section be reorganized without affecting material in other sections of the database.

Using such an "idea-processing" software package is the opposite of production-oriented software or "productivity software." Word processors, a prime example of production-oriented software, take finished presentations and turn them into attractive printed documents. Taken to the limit in a desktop environment, word processing incorporates graphics and typesetting capabilities—advanced features, yes, but the wrong set of features for idea processing. The right features for idea processing are "soft" concepts such as outlining, structural editing, and easy manipulation of displayed information.

Idea-processing software supports brainstorming, fact compilation, organizing, and reorganizing. Idea processors exist in the noncomputer world; for example, notebooks, index cards, blackboards, and appointment books are all idea-processing tools, much as a typewriter is a noncomputer word processor.

Good idea-processing software supports the belief that the world is a chaotic, disorderly, rapidly changing information structure, not a predictable table of rows and columns. With an idea processor you can easily add new facts and ideas and then painlessly reorganize the rest of your model to reflect the change. Idea processing does not exclude the need for word processing; it's useful to have a link between a portable idea processor and a desktop word processor.

Dimensions of the Portable Industry

We've mentioned two portable machines, the Radio Shack Model 100 and our hypothetical 16-bit, 256K-byte, 10-pound "ideal machine." But there are many other machines that qualify as truly portable: the Gavilan, Convergent Technologies' Workslate, GRID Systems' Compass, Sharp's PC-5000, as well as others that are just being introduced. (See Septem-

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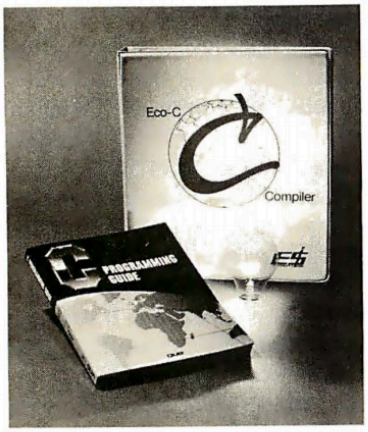

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ber 1983 BYTE, pages 36-44, for a comparative list of portables.)

The trend is upward. The newer machines have lower prices and higher performance, screens and memories are larger, and 16-bit processors are more common. When the market for portables matures two or three years from now, what will a portable computer look like? We guess that there will be three "levels" of portability, each defined in terms of price, capability, and bulk.

Machines at the lowest level will cost about $250 and will use technology similar to that of the Model 100 with a minimum-sized screen, a full keyboard, and no disk drive. It will run a refined version of the Model 100 software (no BASIC, better idea-processing software, less emphasis on specific applications such as an address book and scheduler).

The middle-level machine will cost about $1500 and will provide the functionality of our mythical 256K-byte portable, but it will not have a disk drive. The unit will run ROM-based software, will be compatible with the standard desktop operating systems, and will interface to standard desktop computers as a keyboard. The operating software on this portable will offer sophisticated and easy access to the desktop's printer, typesetter, hard disk, and networking capabilities. Applications software will be up- and downloaded with a single keystroke. A large number of portable-specific applications will be available, including more powerful idea-processing software. It will connect to RS-232C devices and phone lines. Watch for radio communications, an interface to the developing cellular radio network. Because the middle-level portable will not have a disk drive, the bulk of the unit will be only slightly larger than the $250 machine.

The high-level machine will have more memory, a disk drive, perhaps a small printer, and will sell for $2500 to $5000. It will have all the capabilities of the middle-level machine, but it will also weigh more (as much as 25 pounds) and thus be less portable. There will be a smaller market for this machine; it will be aimed at those people who need to carry an entire computer system with them (e.g., consultants with large databases).

Future Developments

How big will the portable-computer industry be, and what impact will it have on society? We believe that the machines at the lowest level will sell in the same mass-market numbers as Atari and Coleco game machines did in 1982. The industry that will serve this huge base of people using portables will be very broad. Users will need software, hardware, and means of hooking into phone and cable networks. They'll need services such as electronic mail and bulletin boards, training, and maintenance—many of the same services that current users of desktop computers need but in larger numbers and with more emphasis on communications and convenience. Certainly, having computers that travel increases the number of places that can be tied into a computer network.

Will portables finally force the development of a national computer resource for mail and messages or a standard for high-level communications? We think so, but it may take as long as five years for such sophistication to develop in the market. Currently, users of the Model 100 and other portables are communicating through networks such as The Source and Compuserve. Yet, because of the current price and performance of these services, we don't expect portable-computer users to turn these networks into mass-market consumables.

A new breed of software will be needed for desktops and mainframes. The bigger machines will have to monitor telephones and respond to commands when you dial in using a portable computer. Bulletin-board software will evolve into an efficient way to access desktop and mainframe resources from remote locations. ■

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