

## Corvus Concept

by Tom Fox

The Corvus Concept system boasts ideas so new they could have easily popped onto the earth from some alien laboratory.

The first hour spent with the Corvus Concept can be a disconcerting one. This new microcomputer is so new, incorporating so many strange ideas, that even experienced computerists can become befuddled about what's going on inside its enigmatic exterior. Those who trouble to make friends with the Concept, however, are rewarded by one of the cleverest, most capable tools available in today's microcomputing market.

The ideas behind the Concept, its appearance, and particularly the operating procedures it demands, are so new they could easily have popped onto the earth from some alien laboratory. On the contrary, the unit was designed within the walls of the Corvus Systems factory (San Jose, CA) by a small group of people whose mission was held a close secret. From this clandestine effort emerged a machine that's not even called a computer, it's termed a Personal Workstation.

The idea of a computerized workstation fits hand in glove with another important Corvus product, the Omninet local area network. Omninet provides the means for interconnecting a collection of individual microcomputers into an integrated, powerful information utility that shares a common database. Until the Concept, computers thus interconnected bore the names Apple, Radio Shack, IBM PC and the like. Corvus' own workstation brings considerably more sophistication to the party. Those really up-to-date in computer happenings call the Concept a Pocket Star, referring to the trail-blazing—but barely known—state-of-the-art Xerox workstation/computer.



The Personal Workstation's flexible display can accommodate up to 17 sub-screens.

By the Corvus definition, a personal workstation is a video display screen and keyboard backed up by a stand-alone microprocessor computer complete with its own random-access memory (RAM) storage. The workstation includes the means to tap onto a local area network, and the right kind of software to perform on its own the tasks put to it by its operator. Such a machine is dependent upon the network for two things only: communication with other users on the network and all of its mass data storage requirements.

The above paragraph defines an almost-computer—a processor with all the elements and capabilities of a stand-alone desktop computer—but lacking one essential element: mass data storage. The simple addition of a disk drive can remove

the "almost," and transform the Concept into a true, stand-alone business computer. As an important supplier of disk drives for other micros, it was a simple matter for Corvus to supply that missing link to purchasers of their new product. The version we tested had both a 6M-byte Winchester and 8-in. floppy disk drive attached.

Turn on a Concept, and you're faced with a screen unlike any other to be found in the computer store. For openers, the black-and-white cathode-ray tube may be placed in the normal horizontal position, or tipped up 90° like some of the really expensive word processing terminals. Laid down, the screen can display up to 48 rows of 120 characters each. Standing up, as many as 64 rows of 91 characters each can be accommodated. Either way, that's about 5,800 characters—about three times normal for today's computing hardware.

Actually, the screen can hold even more information than even that total, but this space is held aside for special Concept functions. For example, there's a row of 10 rectangular boxes along the bottom of the screen that correspond to ten large special keys arrayed at top of the keyboard. Within the screen boxes are little two-line legends telling you what will happen if you push the accompanying key.

Push the key under ListVol, for example, and the screen will display a directory of the files on the disk. Depress LogiCalc, and the optional spreadsheet planning program will load and execute. Hold down the COMMAND key, and the ten key legends will flip to alternate meanings, doubling the number of available commands. They can double yet again by

pushing the SHIFT and/or COMMAND keys in combination.

Pushing certain of these special keys will bring up another set of labels, drastically transforming the immediate meaning of the function keys. A little exploration reveals a logical hierarchy of command functions. Moving from one set to the other is a lot like using the menus in a complex accounting program. The top layer of functions is called the "dispatcher level." Pushing FileMgr brings up the "file manager level," used for such functions as copying and erasing disk files. There are at least five other levels, each with from a few to dozens of sub-functions.

Beyond this, the applications programs provided by Corvus also make extensive use of the function keys and their soft labels. Additionally, information is given to allow independent software developers to follow the same enlightened path.

More than just a clever gimmick, the operation of the special function keys embodies a philosophy of operation that is one of the key ideas that sets the Concept apart. Instead of typing memorized commands into the keyboard, you can sit through long sessions, directing the computer through complex operational scenarios by depressing a remarkably small number of keys in an ordered sequence. A strange and awkward way of doing things at first, you soon find your fingers tracing their own paths through complicated command sequences without requiring a lot of mental supervision. When you become expert, you will find yourself taking full advantage of the almost unlimited type-ahead capabilities of the keyboard buffer.

The Concept's screen has another dramatic trick up its sleeve: windows. Windows are areas that can be defined by the user as sub-screens—small patches that act as if they were independent terminals controlled by the master computer. You can define up to 17 windows on Concept's large display, and make them the rectangular size and shape you wish. Each window can be independently scrolled or paged to your bidding. Each can be displayed in white-on-black or the reverse. Each can be used to capture a computing session with a distinct and independent task.

For example, a word processing session in one area can be suspended (frozen in one window) to perform an auxiliary calculation in the spreadsheet analytic program. The only thing the



*In the horizontal position, the screen can show 48 rows of 120 characters.*

Concept won't do (yet) is allow tasks to run in several windows at the same time.

Another (entirely unexpected) feature of the Concept is the ability to alter the type font utilized on the screen. Such alteration can be performed by the user with a clever set of fun-to-use commands reminiscent of a computerized Etch-a-Sketch toy. There's no need to stick with the traditional English, French or even Greek alphabets—you can make up your own if you wish on the 16-by-16 dot canvas provided for each character. In addition, the high-resolution video display invites the more adventurous to create graphics pictures with this unique tool.

Each of the 17 windows separately defined can be set to utilize a *different* type font, if desired. This could make for some interesting screen displays.

One of the prices paid by pathfinders in the computing game is that although the processor may be clever beyond words, the business world will not be able to actually *use* the machine until someone comes up with applications software to do what computers do best: manipulate words, crunch numbers and solve real-world problems. Corvus has tackled this dilemma on two fronts. First, the

company has provided the software tools necessary for programmers to invent new applications or adapt old ones. Second, two of the company's own finished programs have been included: a word processor and a financial analysis program. Both have been created with imagination to make full use of the best of the distinctive Concept features.

LogiCalc, for example, is a VisiCalc-like financial planner that can take full advantage of the .5M-byte (maximum) memory capacity offered in this computer. The program is rendered far easier to manage by allowing the display of up to 418 10-character cells at once in an 11-by-38 array. That's when the screen is horizontal. Placed vertically, 54 columns of eight rows each can be shown at once, for a total of 432 cells.

The Edword word processing program can show the full text of a standard 8-½-in. by 11-in. sheet of paper without scrolling to additional screens. In addition, tiny visual indicators tell you where you are in your document with little thermometer-style pointer guides. The special function keys are utilized fully to handle word processing directives such as inserting words and lines, making blocks of text, etc. In fact, the alphanumeric keys are utilized almost exclusively

to enter text into the document. That's how keyboards work on typewriters, and that's how they were intended to work. Much of the difficulty in learning to use word processors can be traced to the unnaturalness of sharing keystrokes between the chores of entering text and commanding special word processing functions. The Concept outflanks this problem by use of its 10 special function keys.

In other software areas, the Concept offers the applications programmer a friendly, productive working environment. The operating system is Pascal-based, and integrates best with programs written in that structured language. Fortran is available for the more scientific chores, but Basic, oddly enough, has been forgotten. It's hard to imagine a new microcomputer becoming a success in today's Basic-saturated market without that fundamental and overwhelmingly successful language.

The hardware side of the Concept workstation offers as many fresh ideas as the software developments discussed above. The main microprocessor is the extremely powerful Motorola-designed MC68000 integrated circuit chip. This device

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combines the features of a 16- and 32-bit processor, and runs at computing speeds unheard of in the more ordinary 8-bit chips. In the Concept, all of this power is needed sorely, since the single 68000 is burdened with managing every million-plus dot position on the screen display in real time. Simpler computers delegate much of the character display task to dedicated character generator circuits. The Concept's multi-type font and user-defined windowing capabilities, however, must be served by raw computing power.

The main computing box is actually a base for the swivel-mounted display screen. The base measures 17-in. wide by 15 1/2-in. deep, and sits just 4 1/2-in. high. Like the other Corvus components, its housing is molded from a thick, fiber-reinforced plastic compound. About two-thirds of the interior is taken up by a sliding drawer that contains nearly all of this system's electronic components. The drawer is a sandwich of two large four-layer circuit boards. The largest measures 9 1/2-in. by 13 1/2-in., and contains all but the main memory and screen display electronics.

The second board is simpler in function and includes an array of 32 65K-bit dynamic memory chips that form the 256K-byte RAM. An equal number of empty sockets await the inclusion of additional RAM to bring the computer up to its maximum .5M-byte capacity.

Near the rear of the main circuit board are four familiar-looking connectors. These are identical in function to similar ones in the Apple II, and allow the connection of external peripheral devices. This is how the local disk storage is accomplished, and how a host of special functions can be implemented with Apple-compatible hardware.

The display unit is a massive, nearly cubical unit that houses a 15-in. (diagonal measure) black and white cathode-ray tube. The tube and its supporting circuitry are wide bandwidth design, required for the high-resolution information generated by the Concept's software programs. The display unit carries its own internal power supply, which accounts for a good fraction of the box's mass and requires that a separate AC power cable be routed to it.

The Concept's keyboard resides in a movable 8-in. by 17-in. module in concert with the current vogue. Ninety-one keys are provided, including the ten multi-talented special function keys described above. Each key incorporates IBM's much-copied Typamatic function, which allows a character to repeat continuously when a key is held down for more than a half-second or so. The expanse of the

Concept screen is so vast, however, that it can take a long time to move the cursor around on its surface. To ease this problem, Corvus engineers were kind enough to include a FAST key that boosts the Typamatic function into overdrive.

User documentation for the Concept is supplied in a collection of luxuriously padded mini-binders. Illustrations are generous, and quick-reference cards are supplied for most major software modules. We would complain about the depth of detail provided in the manuals, but a peek at some preliminary volumes suggest that this problem is being corrected at the factory.

The basic Concept workstation equipped with 256K bytes of memory will cost \$4,995. The hardware in this package includes the processor box, display screen and keyboard. It also includes the electronic circuitry necessary to connect the Concept to an Omninet local area network. The price also includes the operating system, Pascal language, 68000 compiler and a host of programmer utilities (even the type font designer). If you need the 512K-byte memory option, add \$1,000.

To transform a Concept into a stand-alone computer, a disk drive is needed. The minimum configuration is the single 8-in. floppy disk drive, listing for \$1,500. More appropriate to the capabilities of the Concept is one of Corvus' Winchester-

technology hard disk drives. A 6M-byte version like the one we tested will cost \$3,195; a wide range of similar devices is offered.

When a non-removable disk like the Winchester is installed, there must be some provision for backing up the data, and for transporting information between the Concept and other computers. This function can be served by the floppy disk just mentioned, or by the Mirror. The latter is a clever Corvus invention that allows you to copy disk data onto a low-cost video cassette recorder.

Available software includes the Edword word processing program at \$495 and the LogiCalc electronic spreadsheet for \$250. A Fortran compiler will cost \$200, and really works best if the 512K-byte memory option has been selected as well. Significantly, the catalog does not list a Basic language interpreter or compiler. Corvus expects to fill this need with the CP/M Emulator, a \$295 software package that was too new for us to evaluate by press time. □

*Technical Editor Tom Fox has authored over 50 articles and editorials for IA since May, 1979. He has spent his entire 21-year career in the field of electronics; with the last 14 years devoted to computer systems and their application to business and industry.*