▪ Pen Operating Systems

by Bruce Brown

The adage that computers are only as good as their operating systems is particularly true with pen-based systems. As pen devices strive for recognition and legitimacy, several features have vital roles: the operating systems that make the hardware bits and pieces work together, the associated user interfaces, and the applications that finally must carry the burden of proving pen systems useful. Because applications are written based on the rules and features of particular operating systems, pen operating systems are key to pen computing success.

Currently there are four major pen operating systems: AST Research's PenRight!, GO Corp.'s PenPoint, Microsoft Windows for Pen Computing, and CIC's PenDOS. All four are available for multiple pen computing devices. None of the four is proprietary, as is the case with systems designed concurrently with hardware.

The first pen operating system, AST Research's PenRight!, originally available only on GRiDPAD units, was used mostly for forms-based data entry. Because of the number of vertical and custom applications that have been written for it, PenRight!, which is now also available on non-GRiD hardware, is currently the operating system of choice for vertical markets.

GO Corp.'s PenPoint is a 32-bit operating system that includes preemptive multitasking and a protect mode. Its interface uses a tabbed notebook and table of contents metaphor. Often initially confusing, especially to people used to DOS or Windows interfaces, PenPoint has many advantages. All PenPoint application programs are installed automatically and remain in the background, and users can call them up at any time to work with relevant data. Sharing data between applications is an integral feature with PenPoint, not just a possibility, as with most other pen operating systems.

PenPoint's preemptive multitasking gives priority to pen input at all times, and the protect mode means that if a given application in PenPoint should crash, other tasks are not interrupted. PenPoint was intended to be used particularly for mobile communications. Current communication applications include GO Fax, GO Mail, and the GO Message Center.

PenPoint was designed specifically for pen computer use (that is, it's pen-centric) and is most appropriate for field applications where PenPoint's strengths can be used, rather than in applications where reliance on existing

> **As pen devices strive for legitimacy, it's the operating systems that must carry the burden of proving their usefulness.**

DOS and Windows applications is a high priority. You can import and export DOS application data with PenPoint, but the process is not as simple as when working in DOS or Windows.

Microsoft Windows for Pen Computing isn't an operating system; rather, it's an operating environment that adds handwriting recognition as well as the ability to use the pen to input data and drawings in traditional Windows applications.

The major advantages of Pen Windows are a short learning curve for those millions who already use Windows and the immediate availability of applications that let you use the pen.

Applications written specifically for Pen Windows, such as the Slate Day-Timer personal information manager, and vertical applications such as forms-

based programs, can make Pen Windows as pen-aware as PenPoint, with the added advantage of sharing data with programs that aren't pen-aware. If you want a pen system for forms and the ability to run Windows or multiple DOS applications, Pen Windows is your best bet.

CIC's PenDOS is also not an independent operating system; it's an operating environment that works directly with DOS. PenDOS adds handwriting recognition and the ability to use a pen for input to all installed DOS applications. Recognition technology development (voice and image, as well as handwriting) is CIC's major direction.

Apple's Newton Intelligence, the pen operating system that will run on the Apple Newton, has a feature that automates tasks by reacting to action words such as "call" and "send." Its recognition engine will learn individual writing styles. Newton Intelligence also has graphics creation and completion tools, as well as communications features.

GeoWorks' GEOS for the handheld Tandy Z-PDA/Casio Z-7000 Personal Digital Assistant is an object-oriented graphical user interface and operating system that can run on low-power CPUs where 100-hour battery life is the design target.

The Amstrad Pen Pad PDA600's operating system, which was written by Amstrad, is object oriented with a user interface that looks like a notebook with page tabs. Pen Pad applications will be distributed via PCMCIA cards.

If pen computing becomes popular, standards will likely prevail, and proprietary solutions will fall from common consideration as hardware and software vendors fight to build user bases and increase profitability by adopting a standard operating system. □