

## Section One: Reading Comprehension

### **Input Devices**

#### **Source Data Automation**

The trend in data entry has been toward entering data more quickly and efficiently. As a result, more people are entering data as close to the source as possible and if possible, when the transaction occurs.

Today, inefficient key-driven data entry is being eliminated whenever possible. In the push toward speed and efficiency, data entry is relying more on **source-data automation**.

For example, the preprinted **bar codes** on consumer products have eliminated the need for most key entry at checkout counters. Checkers need only pass the product over the *laser scanner*. The price is entered into the store's computer system, and the shelf inventory is updated as well.

Data entry is an area in which enormous potential exists for increases in productivity. The technology of data entry devices is constantly changing. New and improved methods of transcribing raw data are being invented and put on the market each month. Scanner technology has spawned an explosion of source-data automation applications.

#### **OCR and Bar Codes**

OCR (Optical Character Recognition) is the ability of scanners to read text information into a computer system. This ability includes reading your hand writing as well. More commonly, scanners read bar codes. Bar codes represent alphanumeric data by varying the size of adjacent vertical lines. Two types of OCR and bar code scanners-contact and laser-read information on labels and various types of documents. Both bounce a beam of light off an image, then measure the reflected light to interpret

the image. Handheld contact scanners make contact as they are brushed over the printed matter to be read. Laser-based scanners are more versatile and read data passed near the scanning area. Scanners of both technologies can recognize printed characters and various types of bar codes.

## **Image Scanners and Processing**

Source-data automation allows direct entry of graphic information, as well as text-based information via scanners. An **image scanner** uses laser technology to scan and **digitize** an image. The hard-copy image is scanned and translated into an electronic format that can be interpreted by and stored on computers. The image to be scanned can be a photograph, a drawing, an insurance form, a medical record—anything that can be digitized. Once an image has been digitized and entered to the computer system, it can be retrieved, displayed, modified, merged with text, stored, sent via data communications to one or several remote computers, and even faxed. Manipulating and managing scanned images, known as **image processing**, is becoming increasingly important, especially with recent advances in optical storage technologies (for example rewritable CD-ROM). Organizations everywhere are replacing space-consuming metal filing cabinets and millions of hard-copy documents with their electronic equivalents. Images processing's space-saving incentive along with its ease of document retrieval, is making the image scanner a must-have peripheral in most offices.

**Page and Hand Image Scanners.** Image scanners are two types: *page and hand*. Virtually all modern scanners can scan in both black and white images and color images. *Page image scanners* work like desktop duplicating machines. That is the image to be scanned is placed face down on the scanning surface covered, then scanned. The result is a high-resolution digitized image. Inexpensive page scanners, weighing less than two pounds accept the document to be scanned in a slot. The *hand image scanner* is rolled manually over the image to be scanned. About five

inches in width, hand image scanners are appropriate for capturing small images or portions of large images.

In addition to scanning photos and other graphic images, image scanners can also scan and interpret the alphanumeric characters on regular printed pages. People use page scanners to translate printed hard copy to computer-readable format. For applications that demand this type of translation, page scanners can minimize or eliminate the need for key entry. Today's image scanners and the accompanying OCR software are very sophisticated. Together they can read and interpret the characters from most printed material, such as a printed letter or a page from this book.

**Image Processing: Eliminating the Paper Pile.** Companies and even individuals are becoming buried in paper, literally. In some organizations, paper files take up most of the floor space. Moreover, finding what you want may take several minutes to hours. Or, you may never find what you want. Image processing applications scan and index thousand, even million, of documents. Once these scanned documents are on the computer systems, they can be easily retrieved and manipulated. For example, banks use image processing to archive canceled checks and to archive documents associated with mortgage loan servicing. Insurance companies use image processing in claims processing applications.

Image are scanned into a digital format that can be stored on disk, often optical lase disk because of its huge capacity. For example, decades worth of hospital medical records can be scanned and stored on a handful of optical laser disks that fit easily on a single shelf. The images are organized so they can be retrieved in seconds rather than minutes or hours. Medical personnel who need a hard copy can simply print one out in a matter of seconds.

The real beauty of image processing is that the digitized material can be easily manipulated. For example, any image can be easily faxed to another location (without being printed). A fax is sent and received as an

image. The content of the fax or any electronic image can be manipulated in many ways. OCR software can be used to translate any printed text on the stored image to an electronic format. For example, a doctor might wish to pull selected printed text from various patient images into a word processing document to compile a summary of a patient's condition. The doctor can even select specific graphic images (X-rays, photos, or drawing) from the patient's record for inclusion in the summary report.