



## AT Quick Reference Guide

## Reading Systems

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Reading challenges can affect people who are blind or have low vision, those with learning disabilities or low literacy skills, as well as those who have difficulty holding books or documents. These individuals may benefit from the use of various reading technologies and strategies. One solution is to use a reading system that uses optical character recognition (OCR) technology to make an electronic copy of a document and then use text-to-speech technology to read the information to the user.

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## **FREQUENTLY ASKED QUESTIONS:**

### **What is OCR? What is meant by scanning text?**

OCR, or optical character recognition, is a process where a page of text is converted into a text file on a computer. First, the image is captured by using a "scanner", which looks like a miniature photocopy machine, with built-in camera. The process is called "scanning" because the camera moves across (scans) the page in order to capture all of the information. The image of the document is digitized and sent to the computer. At this point in the process, the computer is not able to distinguish between a typewritten document and a photograph. Next, OCR software on the computer analyzes the image, and the letters and numbers are "optically recognized" and converted back to text characters. The software runs through additional spelling and grammar checks to create a final text file that can be saved. OCR is a mainstream technology, often pre-packaged with scanners, and frequently used by people who want to obtain an electronic copy of a document without having to retype the information. However, typical OCR software does not read the information to the user. A reading system is needed for that.

## **What is a reading system?**

Reading systems go one step further than the mainstream systems. In addition to allowing a person to save the text file, they have features to help a person review the material. The most common feature is text-to-speech or screen reading technology that allows the user to have the material read to him or her. However, other features, such as magnification or word highlighting, might be included that may assist a person with visually tracking or reading along. Some reading systems are installed into a personal computer; others are self-contained, stand-alone units. Note that if an individual is scanning text for use by another individual (e.g., a teacher preparing material for a student with a disability), then a reading system may not be needed – a mainstream OCR product may work just as well to create an electronic document.

## **What are the differences between a PC-based and a stand-alone system? Which is better?**

Stand-alone systems have a computer, scanner, and software consolidated into a single unit, but the user does not have to know how to operate a computer to use them. All of the controls are menu-driven, and one keystroke generally will initiate the entire process

of scanning, recognizing, and reading a document aloud. Since stand-alone systems do not provide a display, they are typically used by individuals who are blind. PC-based systems add a scanner and software to an existing computer that the user must know how to operate. These systems require more computer knowledge, but add the benefit of being able to edit and print or emboss the scanned documents. In addition, PC-based systems can display the material being read and provide visual feedback (i.e., highlighting the words, etc.) PC-based systems generally cost less, but are not as durable as stand-alone systems. Thus, PC-based systems tend to be favored by individual users, while self-contained systems are often favored by schools and libraries where they may receive heavier use.

### **How accurate is the scanning of the printed text?**

For a standard document with a single clearly printed typeface, accuracy rates of 99% can be expected.

However, this does mean that errors will not occur.

People who use reading systems will occasionally need to guess what a particular word was meant to be.

Educators should perform a quick check of the documents that they scan for a student.

## **Are there types of materials that can't be read?**

Currently, reading systems only work on printed text. Handwriting (including block printing), photographs, and graphs may be displayed on the screen, but the system will not be able to read or describe the material to the user.

## **Are there other options that I can use if my text is already in an electronic format?**

A full reading system may not be needed if a person is only accessing electronic documents (for example, a text book that has already been scanned by a school). In this case, other software might be useful for reviewing the document.

***Screen Readers*** - Screen reading software is used by people with visual impairments to not only read electronic documents, but also read the menus and other information on the computer screen. Keyboard commands are typically used to control the program. These programs often have many features for advanced users, and formal training is recommended to become proficient in using the software. Examples of this type of product include HAL Screen Reader, JAWS, Window-Eyes, and WinVision.

***Text-to-Speech Systems*** - Text-to-speech systems and talking word processors provide auditory feedback for people with learning disabilities while reading and writing on the computer. Graphical icons are typically used to control the program. Other features such as phonetic spell checking and word prediction might be provided to help with writing. Examples of this type of product include TextAssist and textHelp.

**Can these systems read information in languages other than English?**

Yes, generally they can include multiple languages. One system indicated the following: English, Croatian, Danish, French, French (Quebecois), German, Italian, Norwegian, Polish, Portuguese, Portuguese (Brazilian), Russian, Slovak, Spanish, and Turkish.

**Will the people working around me hear what I am reading?**

Most systems can be used with headphone or an audio jack for privacy.

## **Is there a hand-held or portable option?**

The Reading Pen II by WizCom Technologies, Ltd. is a hand-held scanner that can be used to decode individual words rather than read an entire document. The device is designed for users with learning disabilities, and works like an electronic dictionary, by speaking a word, spelling it aloud, and providing a definition. The word in question is scanned by running the pen-sized device over it like a highlighter. Users report that learning to scan with the device takes some practice--it is sensitive to where you start and stop dragging the pen across the page. Users must have both good fine motor skills and good vision. The Reading Pen costs about \$285.

## **What features and products may help a person with a visual impairment?**

- Controls that are easy to locate and operate
- Documentation in an accessible format
- Available products include Cicero Text Reader, Galileo, i-Scan, Kurzweil 1000, OpenBook, Ovation, Pronto, Scan N Talk, and VERA.

## **What features may help a person with a learning disability and/or low literacy skills?**

- The highlighting of words as they are read (many people with learning disabilities benefit from seeing and hearing the word simultaneously)
- A synthesized voice that is adjustable and easy to understand
- Available products include CAST eReader, Kurzweil 3000 and WYNN.

## **What other features should be considered when choosing a product?**

- How well the software recognizes and handles the text layout on a variety of document types including books (with or without images), newspapers (with columns), and bills (smaller sized paper)
- How fast the system scans a page
- Whether a document feeder is available for scanning in large documents all at once

## **How much do reading systems cost?**

Pre-packaged PC-based reading systems cost \$2000-\$3000. Systems put together by separately purchasing a scanner, OCR software, and Text-to-Speech software cost about \$600. Self-contained OCR systems cost \$4,800-\$5,500.

## **INFORMATION RESOURCES:**

### **Guidelines for scanning material for blind and visually impaired students**

By the Assistive Technology & Info. Centre, Student Disability Services, Trinity College Dublin

Tips for converting paper documents into electronic format for students.

[http://www.tcd.ie/disability/pdf\\_files/AticScanning.pdf](http://www.tcd.ie/disability/pdf_files/AticScanning.pdf)

### **Assistivetechnet.net**

Information and links to specific products.

<http://www.assistivetechnet.net>

## **PRODUCT RESOURCES:**

### **Artic Technologies**

PC-based systems: i-Scan (vision); Other: WinVision  
(screen reading)

55 Park Street

Troy, MI 48083

Phone: 248-588-7370

<http://www.artictech.com>

### **Colligo**

PC-based systems: Scan N Talk (visual impairments)

1400 King St Ste E

Bellingham, WA 98226

Phone: 360-647-3404

### **Dolphin**

PC-based systems: Cicero Text Reader (vision);

Other: HAL (screen reading)

100 South Ellsworth Avenue 4th Floor

San Mateo, CA 94401

Phone: 650-348-7401

<http://www.dolphinusa.com>

## **Freedom Scientific**

PC-based systems: OpenBook (visual impairments);  
WYNN Wizard (learning disabilities).

Stand-alone systems: VERA - (Very Easy Reading  
Appliance; vision)

Other: JAWS (screen reading), WYNN (text-to-  
speech)

11800 31st Court N.

St. Petersburg, FL 33716

Phone: 800-444-4443; 727-803-8000

<http://www.freedomscientific.com>

## **GW Micro**

Window-Eyes screen reader; Kurzweil 1000 reseller  
725 Airport North Office Park

Fort Wayne, IN 46825

Phone: 219-489-3671

<http://www.gwmicro.com>

## **HumanWare, Inc.**

Reseller for Kurzweil; textHelp text-to-speech

6246 King Road

Loomis, CA 95650

Phone: 800-879-4868

<http://www.humanware.com>

## **Kurzweil Educational**

PC-based systems: Kurzweil 1000 (vision); Kurzweil 3000 (LD) for Windows or Macintosh.

14 Crosby Drive

Bedford, MA 01730-1402

Phone: 800-894-5374; 781-276-0600

<http://www.kurzweiledu.com>

## **MindMaker**

Other: TextAssist (text-to-speech)

224 Airport Parkway, Suite 550

San Jose, CA 95110

Phone: 408-467-9200

<http://www.mindmaker.com>

## **Robotron**

Stand-alone systems: Galileo and Pronto (vision)

15 Stamford Road

Oakleigh, 3166, Australia

Phone: +61 3 9568 2568

<http://www.robogroup.com>

## **TeleSensory Corporation**

Stand-alone systems: Ovation (vision)

520 Almanor Avenue

Sunnyvale, CA 94085-3533

Phone: 800-804-8004; 408-616-8700

<http://www.telesensory.com>

## **Wizcom Technologies Inc.**

Portable hand-held system: Reading Pen II (learning disabilities)

257 Great Road

Acton, MA 01720

Phone: 888-777-0552; 978-635-5357

<http://www.wizcomtech.com>