A Closer Look

An in-depth examination of special education related issues, strategies, and best practices

Listening to the printed page: features and options in Optical Character Recognition and Reading softwares

By Linda Petty

Introduction

The original, primary purpose of specialized Optical Character Recognition (OCR)/Reading software was to convert printed documents, which were the norm, into electronic text and read it out loud for people who couldn't see to read the printed pages. Optical Character Recognition software and scanning hardware have improved and proliferated. Scanners are now common, have USB connectivity and cost a lot less. The software is now almost 100 percent accurate, instead of an error laden 95 or 96 percent of 10 years ago. Commercial OCR has gone beyond making print electronic to managing documents, converting them to Adobe's PDF format and more. Specialized OCR/Reading software has now expanded to add features like searching for and reading electronic documents, study and writing aids for the converted or electronic documents, such as thesaurus, dictionary, spell checker, talking calculator. Other value added features include:

• being able to e-mail documents

• download documents to portable devices or burn them to CDs as audio files

• being able to do things with your scanner and computer that other people do, such as photocopy and fax documents

The big two players in this field in the North American market are Kurzweil 1000 by Kurzweil Educational and Open Book, owned by Freedom Scientific. There are other, less well known software which will not be discussed in this article – for a complete listing of options see <www.utoronto.ca/atrc/reference/tech/ocr.html>. The biggest commercial OCR product is Omnipage Pro by Scansoft, and using screen reading or magnification with this product, or using other standalone readers will be briefly presented as options at the end of this article.

Here are some Key Factors in OCR/Reading software to consider as you look to match your needs or those of your student or client or school district with software:

1. Accuracy: Available OCR engines for converting the written material into a precise electronic copy of the original formatting the text so that it is understandable: tables, columns, etc.

2. Cost: Purchase price, upgrade costs, lower cost or simpler options.

3. Features for low vision users: Allow customization of color, contrast, font, size, spacing to enhance visibility of text, plus highlighting options for reading/listening connectivity

4. Language options: Scanning in and capacity to read non-English text and non-Latin orthography

5. Advanced features which go beyond reading the text to studying it, working with it, analyzing it, annotating it.

6. Accessibility for those who are not readily able to access the keyboard and ease of use for users who need it easy, don't have time, interest or capacity for memorizing specialized keystrokes for reading.

Following are the features of the products and comparisons between them:

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Phone
507-248-3294

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507-248-3810

Web site
www.closingthegap.com

E-mail
info@closingthegap.com

Check us out on-line:

www.closingthegap.com/

There are a number of features that make **Gallimimus** easy to spot when you see a model or a picture of one. Let's examine each feature.

Long legs
Gallimimus's two back legs were long, thin, and built for great, long strides. If you have ever watched an ostrich run, you will have a good idea of how quickly a **Gallimimus** would have sprinted. If there had been dinosaur Olympics, it would have had a good chance of winning a major track event!

Slim feet
At the end of its long legs, **Gallimimus** had slim feet. The long foot bones make scientists even more certain it could run at a fantastic rate.

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Toothless beak
This champion runner may often have been able to escape from threatening predators with success. And its great speed no doubt helped it catch lots of small prey, such as insects and lizards. But once it caught a victim, **Gallimimus** could not bite into it, like most other dinosaurs. Because it had no teeth, it had to snap things up in its horny beak and gobble them whole.

Reading can also be done in the Image view of Kurzweil 1000, shown here, or the Exact view of Open Book, if images are kept at the time of scanning.
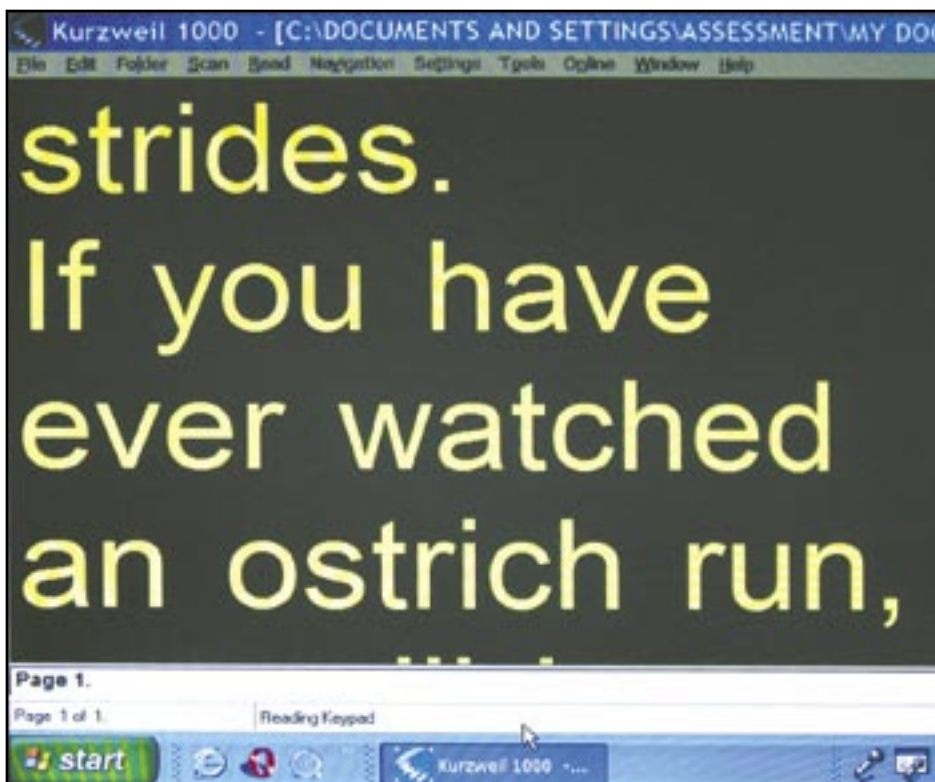
Visual and auditory presentation of text material, as seen in Kurzweil 1000

Company contact Information
Kurzweil 1000, verion 9.02

Kurzweil Educational Systems, Inc., 14 Crosby Drive, Bedford, MA 01730-1402; Phone (USA or Canada): 800-894-5374, (other countries): 781-276-0600; E-mail (general inquiries): <info@kurzweiledu.com>, sales: <sales@kurzweiledu.com>; Web site: <www.kurzweiledu.com/support.asp>.

Open Book version 7.02

Freedom Scientific Blind/Low Vision Group and Corporate Offices, 11800 31st Court North, St. Petersburg, FL 33716-1805; Sales and Information Phone: 800-444-4443 (within US), 727-803-8000 (worldwide); Fax: 727-803-8001; E-mail (general information): <Info@FreedomScientific.com>, (domestic sales): <Sales@FreedomScientific.com>, (international sales): <IntlSales@FreedomScientific.com>.

Cost
Kurzweil 1000, verion 9.02
$995 USD.
• Upgrades for purchases less than one year are free
• Upgrades for purchases more than one year are $95
• Upgrade from another product: $100 off purchase price
Open Book version 7.02
$995 USD
• Upgrade from previous version: Anyone who purchased OpenBook 6.01 as a full product or upgrade after July 1, 2003 will receive OpenBook 7.0 as a free upgrade
• Anyone upgrading a single user license from earlier versions, will pay $150 to upgrade to 7.0

Hardware requirements
Kurzweil 1000, verion 9.02
• 200 MHz or higher Pentium processor speed. If you are using the VoiceTextTM TTS, you'll need 400 MHz Pentium II or faster.
• Memory: 64MB of RAM; 256MB is recommended if using VoiceText.
• At least 500MB of available hard disk space; and an additional 625MB if using VoiceText.
• CD-ROM drive.
• A compatible TWAIN scanner – see company Web site, Compatible Scanners Page, for scanner recommendations.
• Sound Card: Sound Blaster – compatible sound card with speakers.

• Full-size keyboard and/or a 17-button keypad.

• For audio file creation: MP3 encoder and/or media player.

• MP3 file playback on other devices: MP3 player capable of playing multiple sampling rates.

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• 166 MHz processor speed

• 32 MB RAM

• 460 MB available hard disk space before typical installation

• Super VGA display monitor

• Windows compatible Sound Card and PC speakers

• CD-ROM

• A supported TWAIN – compatible or a supported HP flatbed scanner – see company Web site for scanner recommendations.

• 104 key keyboard

Operating Systems Supported

Kurzweil 1000, verion 9.02

Windows 98, Windows NT Service Pack 6, Windows 2000, Windows ME, or Windows XP

Open Book version 7.02

Windows 9x, Windows ME, Windows NT 4.0 Service Pack 6, Windows 2000 Pro, or Windows XP home or Professional

Optical Character Recognition (OCR) engines

Kurzweil 1000, verion 9.02

• RTK version 6

• FineReader engine version 7

• Scansoft Omnipage 12.5, with two settings – one for higher speed, the other for higher accuracy

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• OmniPage 12.5

• Recognita 12.5

• FineReader 7.0

Languages

Kurzweil 1000, verion 9.02

• Can recognize over 170 languages with the Fine Reader engine selected, including medical and legal terms in English and German, and includes legal and medical dictionaries in English and German.

• Can recognize non-latin text e.g. Serbian or Eskimo Cyrillic text, and computer languages such as COBAL and Fortran.

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• Recognizes 15 languages with Fine Reader engine
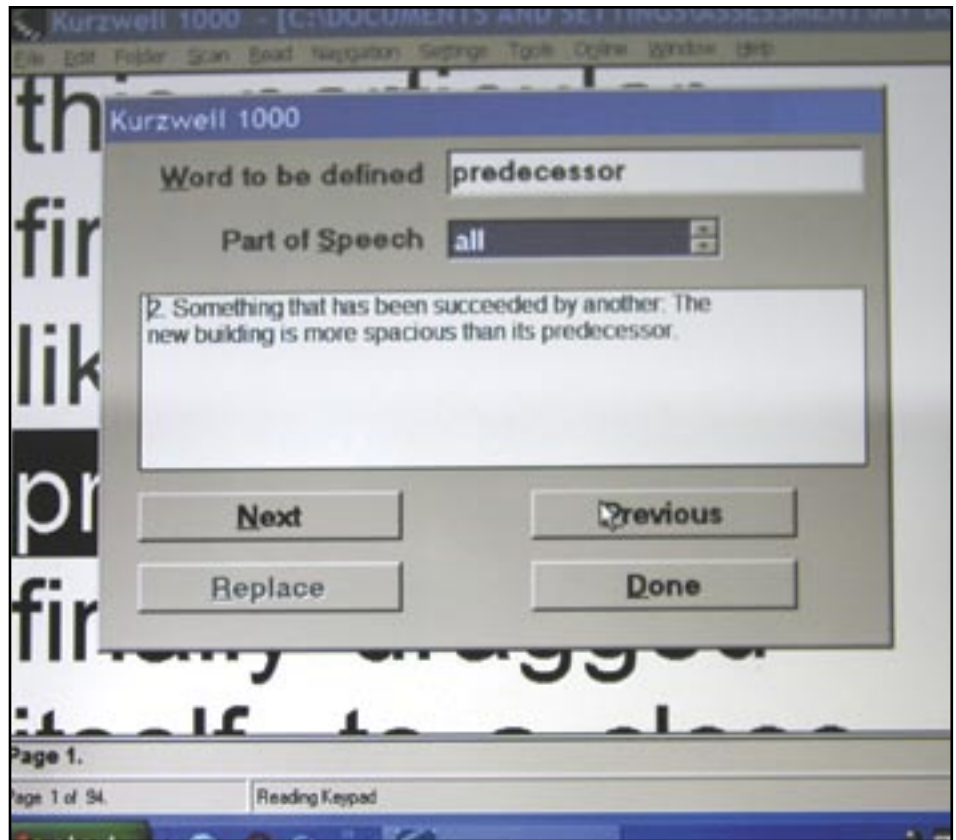
Dictionary dialogue box in Kurzweil 1000

Software speech synthesizers included

Kurzweil 1000, verion 9.02

• L&H RealSpeak

• VoiceText – Two new high quality voices, one female, one male – offer natural sounding voice options to make reading easier to customize and comprehend.

• IBM ViaVoice – provides reading in English, British English, French, Italian, German, Portuguese, and Spanish

Open Book version 7.02

• RealSpeak text-to-speech synthesizer and IBM ViaVoice provides reading in English, British English, French, Italian, German, Portuguese, and Spanish

Verbosity

Kurzweil 1000, verion 9.02

Users are given control over hearing various system or progress messages, or a chime or no sound during program functions and can add an audio tone as desired, e.g. when crossing a page boundary while reading continuously.

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Gives users the options of hearing or not hearing messages on progress, dialog controls, bookmarks, page layout elements and key mnemonics or normal signal tones

Reading

Kurzweil 1000, verion 9.02

• Reads documents, Web pages, dialogs, menus, and more, highlighting the words on the screen as it reads them

• Can add an extra pause after each paragraph

• Can browse with first, last or both sentences in a paragraph

• Can read continuously, or by line, sentence or paragraph.

• Will read a selection or the notes attached

• Can save the image, view it, and also get a description of the layout, move between elements, etc.

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• Reads documents, Web pages, dialogs, menus, and more, highlighting the words on the screen as it reads them

• Can add an extra pause after each sentence.

• Skim reading reads first, last or both sentences in a paragraph

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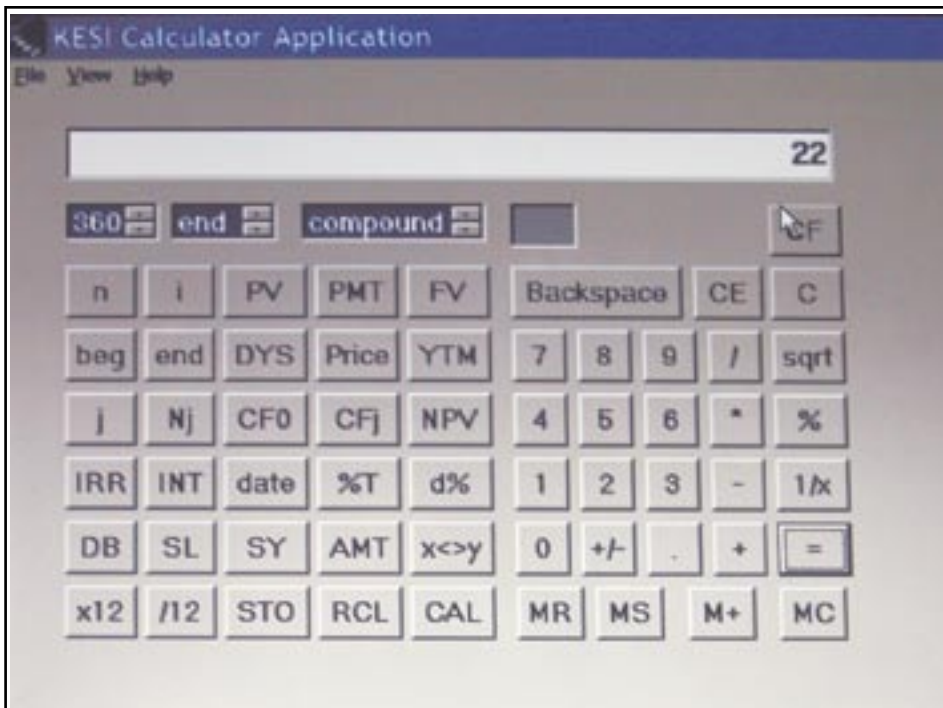
Value added features for Kurzweil 1000 include a talking calculator, shown here with Business Calculator View.

• Say All reads the whole document, or movement can be by word, sentence or paragraph

• Can save exact view, save layout and either explore yourself with auditory description, or the software will give a guided layout description or give a brief auditory page description

Low Vision Features

Kurzweil 1000, verion 9.02

• Magnification and highlighting of text while it reads aloud.

• Able to change font, font color, background color and highlight colors, font size up to 72 points.

• Can space words in increments of one to nine.

• When viewing the image of the scanned page, can Zoom in, see text highlighted while read, but no control over color of highlight.

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• Magnification and highlighting of text while it reads aloud.

• Able to change font, customize font size to 72 points, and color of text, background, cursor text color, text color in highlight and highlight color.

• Can add extra spacing between the elements of characters, words, lines and sentences.

• Provides masking of sentence, line or paragraph, with variable darkness of mask, to support focus on reading area

• In Exact View, includes a zoom option and a text window for easier reading, can see text highlighted in image in same colors as selected for reading.

• Includes low vision menu and low vision settings are displayed on screen in large print, to support the low vision user in making selections directly.

Tools

Kurzweil 1000, verion 9.02

• Supplied with the 10,000 or 100,000 word Fourth Edition of the American Heritage Dictionary and Roget's II New Thesaurus, 3rd Edition

• Can narrow dictionary or thesaurus results using parts of speech, such as noun

• Spell check

• Spell phonetically

• Can scan US, Canadian, British or European currency, using the Scan Currency dialogue box, and placing the bill according to the help offered in the dialogue box (Personally, I was unable to get a ubiquitous Canadian $20 to be recognized in Kurzweil 1000, with two different makes of scanners)

• Can edit on the fly any scanned document, while being read – always uses standard keyboard functions for alphanumeric input, uses function keys or numeric keypad, or menus or hotkeys for control.

• Can edit pronunciations

• Gives the time and date from the computer clock

• Can create three levels of bookmarks, e.g.: key point and two levels of sub-points

• Software will generate bookmarks, based on subjects user inputs into dialogue box

• Can mark a position

• Can create notes attached to document – more extensive than bookmarks for annotating documents

• Can convert bookmarks to notes

• Can summarize documents from subject words

• Can set user defined page numbers and go to them

• Can create, select and activate links in a document or activate links in HTML documents

• "Large print" talking calculator, launches from Launch in File menu: Types of calculator: scientific view, statistics view, standard view and business view

• Classic Literature CD shipped with product, in DAISY formatted text – Allows users to search for a specific book or author from among the hundreds of electronic texts on the new updated version of the Classic Literature CD.

Open Book version 7.02

• Spell check – available in edit mode

• Spell word, spell word phonetically

• Word count

• Installs with Wordsmyth Educational Dictionary and Thesaurus – available in edit mode only

• Bookmarks – can create bookmarks and sort by name and location

• Buckscan – can scan and recognize US and Canadian paper money (personal trials with Canadian bills were not successful)

• Has edit mode, where text can be edited, and read only mode, where keys like the spacebar, perform scanning functions – can set software to open in edit mode, so standard keyboard functions are available

• Control software with menus, function keys, numeric keypad – needs 104 key keyboard

• Can re-number pages

Scanning tools

Kurzweil 1000, verion 9.02

• Can add to or edit OCR corrections

• Can have software optimize the scan for those that can't see document to adjust brightness, etc. – system takes several scans and optimizes settings itself

• Can select to scan at higher speed or higher accuracy

• Batch scanning – saves as image file in images folder, then will offer to recognize the image file when open command is used.

• Gives scanning statistics on last page or all scans, can re-scan a page

Open Book version 7.02

• Can add to or edit OCR corrections

• Can select to scan at higher speed or higher accuracy

• Batch scanning – saves as image file, allows user to specify location

On-line tools

• On-line encyclopedia link to encyclopedia Web sites for Columbia Encyclopedia, Wikipedia (English, Francais or Espanol), Encyclopedia Britannica Concise or other paid encyclopedia subscriptions

• On-line search for books by title or author at Project Gutenberg, Baen Free Library, Bookshare.org, Web Braille, Accessible Book Collection, International Braille Research Centre, Fondazione Exio Galiano (memberships required for some sites)

• Can set "Bookshelf" from above sites and Classic Literature CD

• Can search on-line magazines from Web Braille, ACB Braille Forum, NFB Braille Forum, AFB Access World, Talking Newspaper UK (subscriptions required by most sites)

• Can search Classic Literature CD (supplied with program)

• Searches Kurzweil Web site for KESI newsletters and software updates. User can select to download the updates and program will install them automatically

Open Book version 7.02

• Ships with Freedom Scientific software, Connect Outloud, which provides basic screen reading of Internet Explorer and Outlook Express, as well as FSNotepad

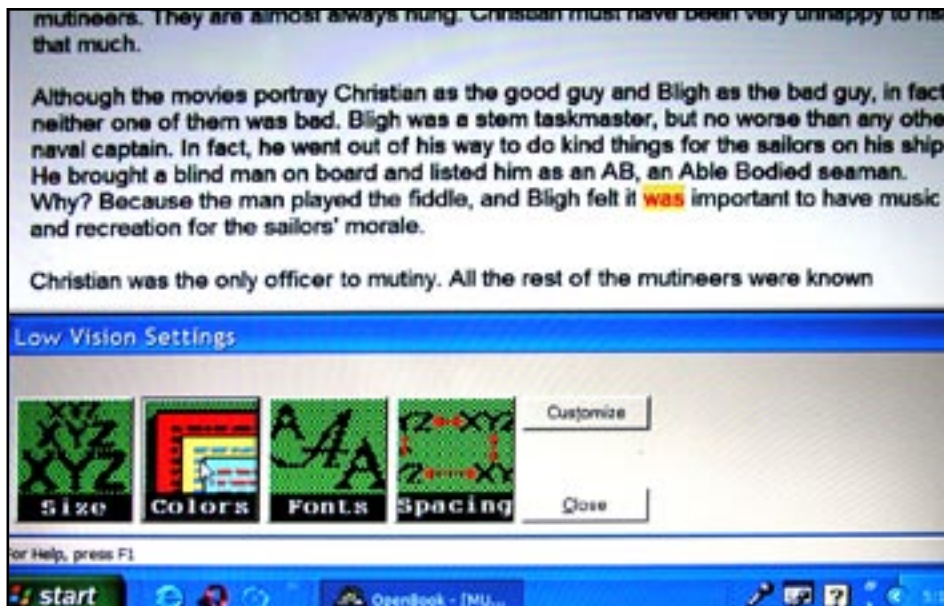• On-line search for books by title or author at Project Gutenberg, Baen Free Library, Bookshare.org

Braille tools

Kurzweil 1000, verion 9.02

• Converts documents to Grade 1 or 2 Braille and sends to Braille embosser

•Imports Braille documents to text

Open Book version 7.02

Open Book has on-screen buttons for adjusting visual settings for low vision users.

• Can Import a Braille file to text format and export a text file to .brf or .brl format

• Can emboss a document in Grade 1 or 2 Braille

Utilities

Kurzweil 1000, verion 9.02

Has KESI Virtual Printer, for converting faxes received or PDF files by –re-recognizing them

• Can launch Fax, Photocopy

• Can send open files from or send files to Road Runner, Book Courier, Book Port, Braille Note, Voice Note, PAC Mate, Braille'n Speak, Braille Lite 18/40, Type 'n Speak, Type Lite 18/40

• Can send files to an E-mail recipient

• Can create Audio files, to be save to CD and played on audio playback machine

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• Can Fax, inputting the sender contact info, etc.

• Can photocopy

• Can launch Notepad, Word and Wordpad, or add other programs to be launched

• Can send open files from or send files to Braille Note, Voice Note, PAC Mate, Braille'n Speak, Braille Lite 18/40, Type 'n Speak, Type Lite 18/40

• Can create Audio files, to be save to CD and played on audio playback machine

Training

Kurzweil 1000, verion 9.02

• Free Braille user manual or cassette taped tutorial available upon request

• Full manual and Quick Reference guide install with the product

• Trial version of Kurzweil 1000 is available on CD upon request

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• Tutorial CD is shipped with purchase of product

• Help menu available with product

• Trial CD available on request

Technical support

Kurzweil 1000, verion 9.02

• Phone: 888-995-9905

• Unlimited toll-free technical support within the U.S. and Canada, 9:00 a.m. to 9:00 p.m. Eastern Standard Time, Monday through Friday

• E-mail: <kurzweil1000support@kurzweiledu.com>

• Access to patches, downloads and company information directly through their software

• Kurzweil 1000 User Group listserv that lets you communicate over the Internet with other users and key Kurzweil personnel. By sharing information about the product, you can learn more about the software and alternative ways to use it.

Open Book version 7.02

• Phone: 727-803-8600, choose 2 for software

• Available from 8:30 a.m. to 8 p.m. Eastern Standard Time, Monday through Friday

• E-mail: <SoftwareSupport@FreedomScientific.com>

This article was originally published in *Closing The Gap*. For more information visit www.closingthegap.com

Accessibility

Kurzweil 1000, verion 9.02

• Can map onto an Intellikeys keyboard or use external keypad to control functions

• Can control with mouse, using menus, or keyboard

• Menus are small print and not magnified like the text being read, but can be read aloud as selected

• In most simplest form, can use Plus key to scan and Insert key to read, on the numeric keypad

• Can map keystrokes in edit mode or in read only mode for an Intellikeys Keypad, or use a numeric keypad

Open Book version 7.02

• There are keyboard layouts for previous Open Book users, JAWs and Window Eyes users

• Menus are small print and not magnified like the text being read, but can be read aloud as selected

• In most simplest form, can use insert key to scan and plus key to read, on the numeric keypad

As you will notice by even a quick comparison, in some areas – price, use of Omnipage 12.5 – these products are the same. In low vision features, Open Book offers more options and ability to customize the presentation. Kurzweil 1000 forges ahead in languages, speech synthesis, study and editing tools, on-line tools and utilities. Both of these packages offer ease of use and both visual and auditory presentation of the text material, and full computer capacity to edit and store it. Briefly, here are several other options, to going the whole package of computer, scanner and $995 specialized OCR/Reading software:

Speech, but no visual display or computer system:

• The Ovation, by Telesensory <www.telesensory.com> or the ScannaR by Pulse Data <www.pulsedata.com> are flat-bed scanners with their own hard drive that will scan any text document and read it back to you in seconds, and have some storage capacity.

Magnification with no speech:

• MyReader by Pulse Data <www.pulsedata.com> scans and captures the entire page and then presents it to users with text size, color, contrast and scrolling, no hard drive storage, just visual image.

Mainstream OCR with screen magnification or screen reading:

• Omnipage Pro, Version 14 by Scansoft <www.scansoft.com> retails for $595 USD and can be used with the support of Zoom-Text, then text read using the AppReader or DocReader, or operated with the support of JAWs or Window-Eyes, then the text read back from a word processor by the screen reader.

At least until the next version change, here is a list of major options and features in the wonderful world of making the written word accessible. The next and final article in this series will be the auditory journey into screen reading – turning pixels into speech, manipulating Web sites and user interfaces with an intelligent talking software agent. Screen reading is a territory of even stronger loyalties, emotions and opinions than OCR products, so watch out!

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